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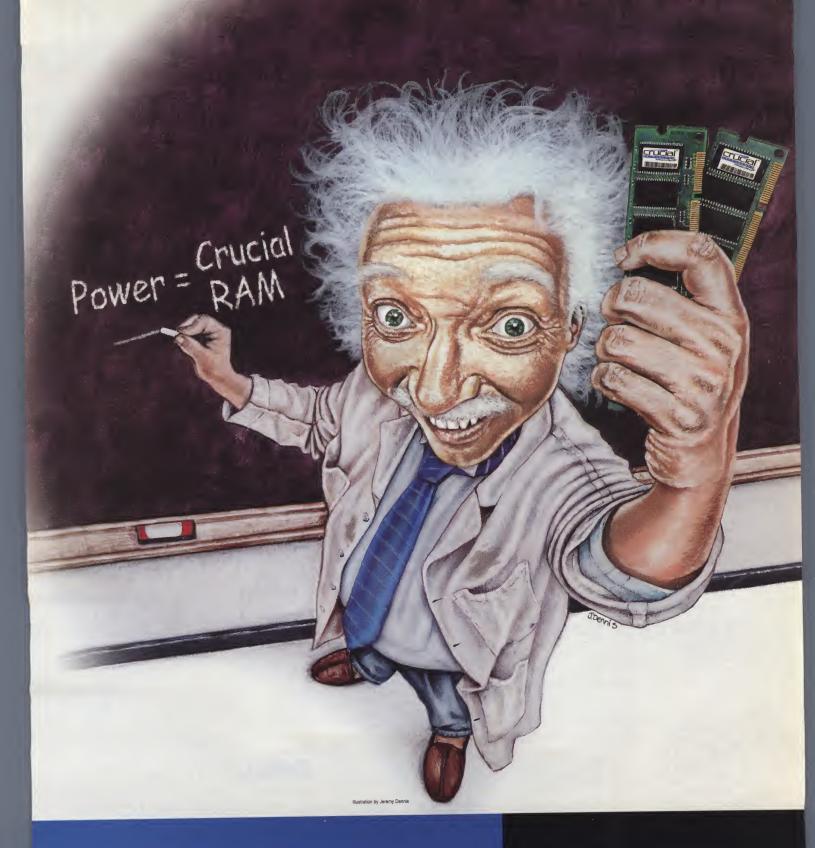
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IBM ThinkPad A20

NOTEBOOKS

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*e*business tools

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JANICE CHEN

Fleet-Footed Computing

Much to my fiancé's chagrin, I've been toying with the idea of buying a foldable Razor scooter. You know the one: a foot-powered contraption 12-year-olds across the country have been using to terrorize pedestrians. He thinks it's a geeky fad. I think it could cut my 15-minute commute on foot to a 5-minute scoot.

But before I start kicking my way to work, I'll have to lighten the load in my backpack to achieve maximum velocity. Lucky for me, slim and light have become watchwords for almost every technology product these days.

Take notebooks, for example. Travelers who wanted lightweight computers once had to settle for anemic subnotebooks with tiny screens and limited capabilities, but no more. Our cover story, "Light Makes Right" (p. 130), reports on the new generation of ultraportable notebooks. They're thinner than ever but fully loaded with heavyweight features. In fact, Compaq's Armada M300—the Ally McBeal of notebooks at just 3.4 pounds and 0.9 inches thick—manages to pack in a 600MHz Pentium III, a 12.1-inch screen, and a 12GB hard drive. Equipped with docking stations or external drive options, all five of the notebooks in our roundup offer the functionality you'll need for conventional business-computing tasks.

Anyone who road-trips to make presentations will also be impressed with the Boxlight XD-9m ultraportable projector, reviewed on p. 118. Despite its under-5-pound weight, this lithe DLP projector puts out an image bright and sharp enough to compete with much heftier models.

Of course, traveling light isn't all business. The Creative Nomad II MG (reviewed on p. 119) is smaller and lighter than a pack of cards, but provides hours of MP3 entertainment on the go. And on p. 120, you'll find Palm's new m100, a PDA for the rest of us. With a slick design that rivals the pricey Palm V for sheer style, the new Palm's low price of $149 will have the counter-corporate set beaming in no time.

It isn't just mobile products that are getting sleeker. In our über-guide to buying a desktop system— "Picking the Perfect PC," on p. 148—you'll notice that not only have monitors become size-conscious, but that system boxes are becoming almost aerodynamic.

More and more monitors are coming in short-neck designs that take up less desktop real estate than regular-depth monitors. In fact, a short-neck 19-inch monitor sticks out less in back than a standard 17-inch one does. But if you're really looking to get slim and trim, choose a flat-panel LCD monitor. You'll pay a premium, but this year's LCD monitors have seen lower prices and better technology than in 1999.

When it comes to the systems themselves, you have increasingly varied options in form factor. If you're willing to sacrifice nearly all expansion options, supersleek PCs like IBM's NetVista X40 are so compact that you might think the CPU box is missing. For a less dramatic but still fairly diminutive option, check out our review of the Sony VAIO PCV-J100 (p. 94), which offers digital-video-production capabilities in a petite minitower case.

Whether you're shopping for desktop computers, monitors, handheld devices, notebooks, or any other technology tool, chances are the newest models are smaller, lighter, sleeker, and brighter than their predecessors were. And that's good news for those of us who like to hit the road kicking.

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The ViewSonic VP151 really sparkles, with dual-mode-inputs, built-in sound, pivot support, wide viewing angles, and even picture-in-picture display of composite video. It earns our high-end Editors Choice. –PC Magazine, May 2000

PC MAGAZINE EDITORS' CHOICE

VP151
May 2000

ViewPanel® Series

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VP151†	15.0	COMPOSITE VIDEO	1280 x 1024	DIGITAL/ANALOG	YES
VG151†	15.0	PIVOT	1024 x 768	DIGITAL/ANALOG	
VP181†	18.1	COMPOSITE VIDEO	1600 x 1200	DIGITAL/ANALOG	YES
VG181 ∞	18.1	PIVOT	1280 x 1024	DIGITAL/ANALOG	

†Currently audio, composite video and picture-in-picture features are supported via analog only. ∞Also available in black bezel

Professional Series

ViewSonic Model	CRT Size/ Viewable	Horizontal Dot Pitch/ Aperture Grille Pitch	Maximum Resolution	TCO Low Radiation
PF77 #△	17/16.0	0.25/AG	1600 x 1280	TCO '99
PF77S #	17/16.0	0.25/AG	1600 x 1280	TCO '99
PS77S *	17/16.0	0.22	1600 x 1280	TCO '99
PF790 #	19/18.0	0.25-0.27/AG	1600 x 1280	TCO '99
PF795 #	19/18.0	0.25-0.27/AG	1920 x 1440	TCO '99
PS790 *	19/18.0	0.22	1600 x 1280	TCO '99
P810	21/20.0	0.22	1800 x 1440	TCO '99
P815 * *	21/20.0	0.22	1800 x 1440	TCO '99
PF815 #	22/20.0	0.25-0.27/AG	1920 x 1440	TCO '99

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ViewSonic Model	CRT Size/ Viewable	Horizontal Dot Pitch	Maximum Resolution	OnView®	Low Radiation
EF70 #	17/16.0	0.25/AG	1280 x 1024	YES	MPR-II
E655	15/13.8	0.24	1280 x 1024	YES	TCO '92
E771	17/16.0	0.24	1280 x 1024	YES	MPR-II
E773	17/16.0	0.23	1280 x 1024	YES	TCO '99
E790 ∞	19/18.0	0.23	1600 x 1280	YES	TCO '95

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Graphics Series

ViewSonic Model	CRT Size/ Viewable	Horizontal Dot Pitch	Maximum Resolution	OnView Controls	TCO Low Radiation
G773	17/16.0	0.22	1280 x 1024	YES	TCO '92
GS773 *	17/16.0	0.22	1280 x 1024	YES	TCO '92
GS790 *	19/18.0	0.22	1600 x 1280	YES	TCO '92
G810	21/20.0	0.21	1600 x 1280	YES	TCO '99
GS815 *	21/20.0	0.21	1920 x 1440	YES	TCO '99

*Short Depth Monitor

MultiMedia Series

ViewSonic Model	CRT Size/ Viewable	Horizontal Dot Pitch	Maximum Resolution	TCO Low Radiation	Speakers
M50	15/13.8	0.24	1280 x 1024	TCO '92	2-watt (X2)
M70 ∞	17/16.0	0.24	1280 x 1024	TCO '92	2-watt (X2)
G70m	17/16.0	0.23	1280 x 1024	TCO '99	3-watt (X2)
G90m	19/18.0	0.22	1600 x 1200	TCO '99	3-watt (X2)

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Model	CRT Size/ Viewable	Horizontal Dot Pitch	Maximum Resolution	Screen Treatment
Q41	14/13.2	0.24	1024 x 768	Anti-Static, Anti-Glare
Q51	15/13.8	0.24	1024 x 768	Anti-Static, Anti-Glare
Q55	15/13.8	0.24	1280 x 1024	Anti-Static, Anti-Glare, Anti-Reflection
Q71	17/16.0	0.23	1280 x 1024	Anti-Static, Anti-Glare, Anti-Reflection
Q75	17/16.0	0.21	1600 x 1200	Anti-Static, Anti-Glare, Anti-Reflection
Q95	19/18.0	0.23	1600 x 1200	Anti-Static, Anti-Glare, Anti-Reflection
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BIDDER BEWARE

Your July article on PC auctions ("Click Once, Click Twice, Sold!" p. 178), like so many of your other articles, was right on the money, but the words *caveat emptor* should have been used in every second sentence. If I had a gripe with online auctions, it would be with the proxy bidding systems many sites use. Like it or not, they work for the auction house and not the consumer. It sounds good to have the system make bids for you, but when you look at a bid item, you see a bunch of proxy icons sitting there. Guess what happens the moment you raise your bid? They all follow suit, and the "winner" typically pays close to retail. The bottom line: PC auctions used to offer some decent bargains. No more.

LUTZ MOECKEL

SORRY, UNCLE BILLY

Your feature "So Long, Shrink-Wrap" in the August issue (p. 182) was obviously biased toward software manufacturers. I understand how this could happen, given that your publication's revenues are based on the marketing of software and hardware.

Yes, wouldn't it be great if software manufacturers could rent their software for bloated fees instead of simply selling licenses for their usage? And wouldn't it be great if they could completely eliminate production costs, further maximizing their profits?

Don't hold your breath. Internet security concerns (which are increasing in direct proportion to Internet security violation scams)

will prevent most intelligent business owners from "letting it all hang out" on the Internet via databases, PIMs, and other such programs. Also, the average consumer won't want to depend on online software that will be free at first, then available only for increasingly costly rental fees.

You also neglected to mention the most obvious alternative to bloated and pricey packaged software: freeware. The *alt.comp.freeware* newsgroup has identified viable free alternatives for every category of software, with the exception of TrueType font editors. It's even discussed creating its own non-bloated, open-code Web-surfing freeware. Of course, you won't print this letter, because you wouldn't want to upset Uncle Billy.

JOHN CORLISS

Sold!
Click Once, Click Twice,
Online auction sites let you bid your way to a bargain PC.
BY KEVIN SAVETZ

E-MAILS FROM HEAVEN

As a funeral director in Michigan, I must say, the July news story "Interment By Internet" (p. 48) surely raised my eyebrows. I do have one question for FinalThoughts.com, though. Once someone has registered his or her final wishes with the Web site, who makes contact with the deceased's family to let them know the wishes are documented? Do you boot up the computer when you reach the Pearly Gates and e-mail them? Just wondering.

CHARLES PERRY

EVERYWHERE WEB

I found the July feature "The Web Is Calling" (p. 186) an excellent review of where wireless has been and where it is going. While personal preferences, needs, or circumstances will dictate what combination of keypad and screen size users deploy, we still haven't seen the practical convergence of voice input with screen output. Until full capabilities are available, and the price of communication stays reasonable, nobody knows what users will exactly want.

Also, we still need to learn about the future cross-media etiquette of unified communications for mobile access and response. It should be an interesting shift from traditional telephones and messaging.
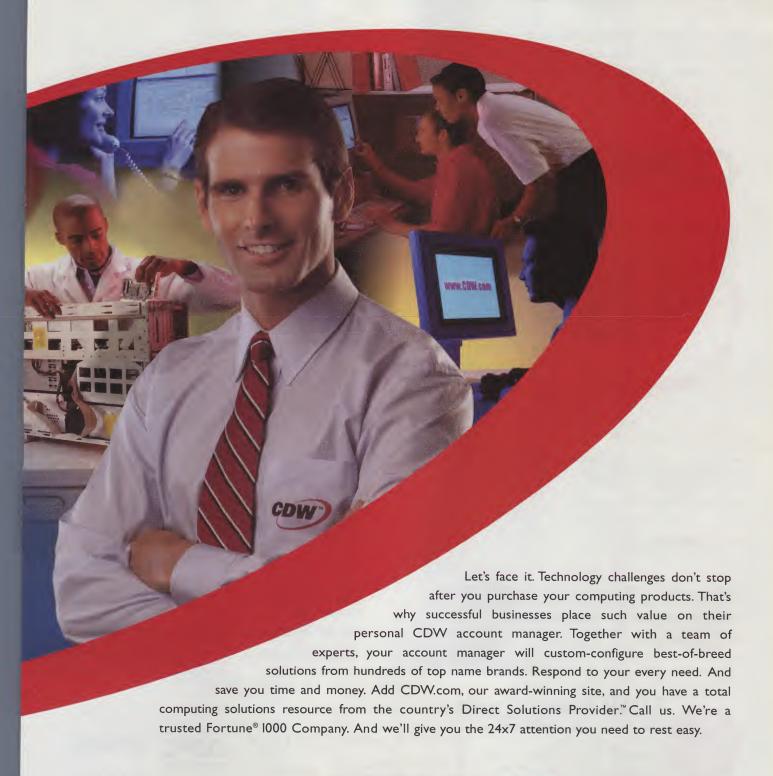
ART ROSENBERG

CORRECTIONS

After our September issue went to press, *we* learned that the Quantex SM933sx we reviewed (p. 106) is no longer available. According to a Quantex representative, "Our RDRAM-based packages, including this one, have been discontinued because of high pricing and low availability of RDRAM, as well as questionable performance benefits of 820/RDRAM solutions over 815e/SDRAM platforms."

Also, due to an editing error, we incorrectly reported the amount of hard drive space needed to save 135 4-minute CD-quality MP3 songs as 5GB in the September Tune-Up feature ("Easy as MP3," p. 280). The hard drive space needed to save this many files (where each file is roughly 3.7MB) is approximately 500MB.

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Is Windows Me Right for You?

The operating system's integrated multimedia, reliability, and home-networking features bring Windows 98 up to date for many users.

BY JAY MUNRO

Microsoft Corp. has finally gone millennial with the launch of Windows Millennium Edition (Me), its follow-up to Windows 98. The updated OS strives to create an easier, more satisfying experience for consumers, particularly those interested in digital audio, video editing, and home networking.

There are some notable improvements here, but do they warrant shelling out $59.95 (the upgrade price for Windows 98 users, through Jan. 15, 2001), especially when some of the components are available as free downloads? The answer depends on how you use your computer.

Windows Me builds on Windows 98, borrowing a few features from Windows 2000 and adding some brand-new components designed to simpli-

fy and enhance multimedia computing. But it also aims to provide a more robust, reliable OS that requires less support and provokes fewer headaches. For instance, a nicely integrated help system and dozens of system tours let users better diagnose and resolve problems themselves.

Improvements center on four areas: PC health, digital media, the online experience, and home networking. We installed the OS on one of our own PCs to check out its stability and utility. To get a true end-user experience, we upgraded an aging 300MHz K6-2 system with 192MB of RAM and a 15GB hard drive, running on a small home Ethernet network.

Overall, the upgrade from Windows 98 went surprisingly well. Windows Me deftly handled all our hardware and network settings, including the

shared-network WebRamp 310i modem. We were able to immediately access the home network and Web, and all hardware worked, except an ancient version of DigitalPersona U.are.U. (We updated the software, however, and the fingerprint-ID device then worked flawlessly.) Our only complaint was that the new version of Internet Explorer overwrote our preference of a blank starting page with the MSN home page.

PC Health: Let's face it: If your PC won't run, nothing

else matters. And that makes PC health a paramount concern. To that end, Microsoft has eliminated Real Mode code in Windows Me, resulting in faster and more reliable bootup, as well as better overall stability. Most DOS programs will still work, although you won't be able to boot to a DOS prompt.

Microsoft also offers improved hardware support this time around, working with vendors to create, test, and certify drivers that are better recognized by Me, thereby making installation easier and reasonably foolproof. Most existing Windows 98 products will work fine. For example, we installed the new U.are.U Pro

The intuitive Help interface lets you revisit previous requests with the Recently Viewed Help Topics list.

fingerprint-ID system without a hitch, even though it had not yet been certified for Windows Me.

Windows Me also protects critical system files against corruption or deletion, keeping the PC stable by automatically replacing files that have been changed. Its System Restore feature automatically takes "snapshots" of your configuration and lets you revert to an earlier working configuration should your system go south.

Digital Media and Entertainment:
One of the snazziest features of Windows Me is the new Windows Media Player 7, which combines a CD player, audio and video playback, CD

Movie Maker lets you record from your digital video camera or import video files for drag-and-drop-simple editing.

With Windows Media Player 7 you play audio, video, Internet radio, or CDs from one location, at the click of a mouse.

ripping, and an Internet radio tuner. Like other audio jukeboxes, the Media Player can be dressed up with "skins" and will visually interpret your music with a variety of abstract animations. And using the Windows Media Audio format at 64Kbps provides CD-quality audio files at half the size of corresponding 128Kbps MP3 files. The player won't rip CDs in MP3 format, although it does play MP3 files.

The new scanner and camera wizards let users import images from devices that support Windows Image Acquisition (WIA), a new alternative to TWAIN. Using the wizard, you preview your pictures, then download only the

images you want to keep. You can rotate the downloaded images, if needed, and save them as JPEG files.

Microsoft addresses the craze for home digital-video editing with its new Movie Maker software, which lets you edit sound and video clips. Featuring technology found previously only in high-end software, Movie Maker automatically breaks video input into separate clips for editing. The clips are assembled on a timeline and mixed with imported or recorded audio to produce a movie you save to Microsoft Windows Media Format files to view and share.

Online Experience:
Windows Me ships with Internet Explorer 5.5, and includes support for Print Preview, which lets you see how a Web page will print before you commit it to paper. IE 5.5 also takes on Me's new Help look and feel for the MSN search window, making it easier to find sites, people, or businesses on the Web.

The integration of the Dial-Up Networking folder with the Connection manager makes establishing Web connections more intuitive. For instance, you can configure a dial-up connection and at the same

time set username and password in one central location. As part of the home-networking improvements, Internet Connection Sharing (ICS) enables you to employ one PC to connect to the Web and share that connection with all other machines on your home network, solving the single-phone-line battle that is waged daily in many households.

Home Networking:
Windows Me's new Home Networking wizard walks you through your network setup, assigning unique machine names, enabling printer sharing, and even creating a disk that gets other machines onto the network with the right settings. Windows Me's support of Universal Plug and Play (UPnP) opens a wide choice of easily installed hardware from hardwired to wireless networking connections, and the adoption of Windows 2000's TCP/IP stack makes it more stable. If things don't go well, the troubleshooter does a good job of helping you figure out what went wrong.

TO ME, OR NOT TO ME?
Overall, like Windows 98, Windows Me isn't a must-have for everyone. If your current Windows 98 machine is humming along smoothly and you're not installing new hardware or a home network anytime soon, you probably don't need to upgrade. If you want, you can download Internet Explorer 5.5 and Windows Media Player 7 free from

Microsoft's Web site.

But if you tinker with your machine periodically, you'll find that the system file-protection and restore features may be well-worth the upgrade price. Moreover, if you want to install a home network, share printers, and establish new Internet connections, Windows Me can make it easier. And better support for new technology and devices will also make the Me upgrade appealing if you expect to add new hardware in the future.

All things considered, Windows Me is an attractive face-lift to Windows 98. Those who buy new consumer PCs will automatically get the new OS. But those who plan to hang on to their Windows 98 systems a while should carefully weigh their current and future hardware needs. Many might

The Windows Me Home Networking wizard deftly walks you through the intricacies of network setup.

do well to cool their urge to upgrade until the first Windows Me service pack arrives. ▼

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Most participate for fun—and for an ego boost—rather than for money, although it's clear some are consultant types looking for potential new clients. You'll find subject areas in 14 categories and hundreds of subcategories, and it's easy to pose a question (anonymously, if you'd like).

At **ExpertCentral.com,** which is affiliated with **About.com,** experts can charge fees or submit proposals for a project. The site takes a 15 percent transaction fee on paid advice, but you can ask many questions for free. You'll find 12 computing categories, with 374 experts registered in the hardware section alone.

Don't want to wait for a solution to a tough computing problem? Try **Expertcity.com,** a site that hooks you up in real time with computing experts who review your question and instantly bid on what they'll charge to answer it. (Expertcity.com has an affiliation with and is available at **ZDNet,** *Computer Shopper's* parent company.)

You can look over the experts' profiles, reputations, and prices, then pick the one you want. You then begin a real-time chat to solve the problem. If you download a free utility, you can even surrender control of your PC and let the expert try to solve the problem as you sit back and watch.

—Don Willmott

It's a Woman's Web

Women on the Web overtook men early this year, comprising 50.4 percent of all U.S. Internet users, according to **Media Metrix** and **Jupiter Communications**. While the overall U.S. population is 51.1 percent female, double-x-chromosome surfers are gaining fast on their male counterparts. Here's where to find them:

- Young girls go for TV Web sites, music, and learning.
- Teens like fashion, shopping, and music.
- Young women look for communities focused on child care.
- Seniors like family, health, genealogy, and joke/fun pages.

Crusoe on Course For Debut

Transmeta Corp.'s Crusoe processor, a supersecret project unveiled in January, will find a home in notebooks and Internet appliances by year's end.

Crusoe CPUs come in two flavors: the TM3200 for use in mobile Internet devices, and the TM5400 for ultraportable notebooks. Both are engineered with code-morphing software that cuts the amount of power consumed without affecting performance.

The TM5400 adds a battery-optimizing technology called LongRun that helps it deliver up to 8 hours of notebook battery life on a single charge, according to Transmeta.

Crusoe has plenty of support from notebook manufacturers, including heavyweights such as **IBM, NEC,** and **Hitachi.** IBM commits to producing a Crusoe-powered notebook by year's end. While plans are sketchy, IBM says it may employ the chip in a consumer-oriented ThinkPad i Series notebook, rather than the ultraportable ThinkPad 240. NEC and Hitachi say users will see a product no earlier than year's end.

Compaq Computer Corp. also may market Crusoe-based products, if indirectly. **Quanta Computer,** the company that manufactures some notebooks for Compaq, has embraced the chip. The company also will manufacture IBM's Crusoe-based notebook and **Gateway's** Web pad, which is being marketed with **AOL** and is due in early 2001.

Another source of Crusoe-based Internet devices will be **ViewSonic Corp.,** which says it will deliver Transmeta-powered units by year's end.

—Richard S. Shim

IBM has demonstrated Crusoe-powered ThinkPads.

Sign on the Virtual Line

When President Clinton signed the Electronic Signatures Act on June 30, he ushered in a new era in which digital signatures have the same legal validity as those *on paper.* And that means there are fewer impediments to creating contracts and sending and receiving notices and disclosures online.

The result should benefit e-commerce, especially in emerging electronic marketplaces where deals made online are often *consummated* with old-fashioned **FedEx** shipments of contracts and documents that must be signed. The potential savings of both time and costs are huge. In fact, some mortgage experts suggest that the cost of processing a mortgage will be cut in half when the entire process moves online.

But what exactly is an electronic signature? According to the new law, it's an "electronic sound, symbol, or process," and that vague definition leaves big questions for legal and security experts to ponder.

President Clinton swipes his identity with a smart card.

Encryption is not part of the definition, nor is any specific technology. Though many companies are working on secure digital-signature technologies, the term "digital signature" doesn't appear in the law.

With so many logistical questions yet to be tackled, widespread adoption of e-signatures, and the cost savings that will come with it, are still a few years away. So don't toss your pens just yet.

—D.W.

CLINTON PHOTO BY CORBIS

NET NOW

Online in The Air

How often have you sat squirming in your airline seat, thinking of what you could accomplish if only you had access to the Web and e-mail? Good news for frequent flyers: Several companies are working to develop satellite-based systems that will let you plug your laptop into an in-seat data port for high-speed Web access.

In Flight Networks plans to offer broadband Internet and e-mail access to commercial airlines late next year. The system will transmit information to and from the aircraft via an existing network of satellites at blazing speeds of up to 800Kbps.

Similarly, **Tenzing Communications** will allow passengers to access e-mail and selected Web content (which is not live, but is updated during the flight). It will require users to download software to use the system, and most airlines will charge passengers to use the service.

In October, **Air Canada** plans to begin a six-month test of the Tenzing system on six Boeing 767 aircraft flying North American routes. **Cathay Pacific** will install the Tenzing product on its planes starting in the second quarter of 2001.

And later this year, **Boeing** will launch a similar service called Connexion by Boeing that will give flyers access to the Web and television using a high-speed satellite-based network. No carriers have signed up for the service yet, however. —*Elaine X. Grant*

A GIG TO GO

Roving data pack rats—and byte-hoarding hamsters—have something to celebrate: **IBM** has tripled the storage capacity of its diminutive Microdrive. The $499

So small, a hamster could handle it.

hard drive, which weighs 1 ounce and is engineered to fit in PDAs, digital cameras, and MP3 players, now stows a whopping 1GB of data. IBM also released a $399 512MB Microdrive for those with more moderate storage requirements.

(though you'll need to establish an account first, either by phone or Web). Most CDs listed on StarCD cost between $12 and $13. —*E.X.G.*

Radio Star

Heard it on the radio, gotta have it? Point your browser to **StarCD** *(www.starcd.com)*. The site, which launched in 33 markets in July, allows you to identify and buy music aired on local radio stations.

It works like this: You hear a tune on the radio, then surf to StarCD, which monitors radio broadcasts and keeps track of the songs played. If you don't have a computer handy, you can access StarCD's database and buy CDs using a regular phone or a WAP-enabled wireless device. However you get there, the site enables you to quickly ID the song, artist, and CD title, then purchase the disc.

StarCD lists each city's radio-station call letters, format, and frequency, plus the most recent song title and artist. You can click on the speaker icon to hear a sound clip, on the song title to see other songs on the same album, on the artist to get a complete list of albums, or on the radio station to see a complete playlist for the day.

To access the system using a WAP-enabled device, go to *www. starcd.com/wap,* then follow prompts to listen to the song. In some markets, the company allows users to access the service by dialing *CD (*23) on a mobile phone.

On a regular phone, simply dial a local number and enter the radio station's frequency. The service will identify the most recently played song and give you the option to listen to a 30-second clip. If you like what you hear, you can opt to buy with a few key presses

VALUE LINE **DIGITAL CAMERAS**   A snapshot of digital cameras found on computershopper.com for less than $1,000

Agfa ePhoto 307 **$218**
640x480 resolution, 4MB internal memory, automatic focus, no LCD, serial cable, Mac and PC

Kodak DC240 **$411**
1,280x960 resolution, 8MB CompactFlash card, automatic and manual focus, optical zoom, 1.8-inch LCD, USB and serial cables, PC only

Fujifilm MX 2900 Zoom **$649**
1,800x1,200 resolution, 8MB SmartMedia card, automatic and manual focus, optical zoom, 2-inch LCD, serial cable, Mac and PC

Epson 3000z **$888**
2,544x1,904 resolution, 16MB CompactFlash card, automatic and manual focus, 1.8-inch LCD, USB and serial cables, optical zoom, Mac and PC

$200	$400	$600	$800	$1,000

Casio QV-100 **$386**
640x480 resolution, 32MB internal memory, automatic focus, 1.8-inch LCD, serial cable, Mac and PC

Canon PowerShot S100 **$578**
1,600x1,200 resolution, 8MB CompactFlash card, automatic and manual focus, optical zoom, 1.5-inch LCD, USB cable, PC only

HP PhotoSmart C500xi **$709**
1,600x1,200 resolution, 16MB CompactFlash card, automatic and manual focus, optical zoom, 2-inch LCD, USB and serial cables, Mac and PC

Nikon Coolpix 990 **$889**
2,048x1,536 resolution, 16MB CompactFlash card, automatic and manual focus, 1.8-inch LCD, USB and serial cables, optical zoom, Mac and PC

Source: computershopper.com, August 11

ILLUSTRATION BY BILL RIESER

B2B BUZZ

Online Sellers Unprepared for HOLIDAY 2000

The 2000 holiday shopping frenzy is fast approaching, and online sellers have a lot of work to do to keep up with demand. A recent report evaluating 50 top online sellers by Resource Marketing reveals not a single one has mastered the art of online gift services. Here are some of the study's findings:

• 44 percent of the sites don't offer gift-wrapping services.
• 90 percent don't have full-featured gift registries.
• Less than 25 percent let consumers search by more than one criterion.
• Only 18 percent offer live customer support.

The report also revealed the following specific information:
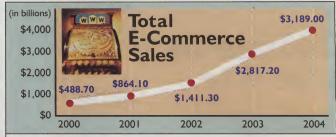
• Beyond.com's Quick Buy option lets you buy only one item at a time, and you must re-enter all your information with each transaction.
• A search for wooden trains in Amazon.com's toy section returned 240 results, including a plastic ambulance.
• Crate & Barrel snail mails purchase confirmations.
• E-mail notification of a Banana Republic transaction came from the Gap.
• Instead of authorizing a return, a customer-service rep at Egghead.com suggested keeping the product or selling it to a friend.
• A kite ordered from BlueLight.com arrived with no invoice, packing slip, or clue to the company's identity.
• Wal-Mart's site (www.walmart.com) is replete with dead links.

The report is a result of thousands of hours and hundreds of thousands of dollars' worth of secret cyber shopping. Researchers rated sites on 500 consumer-based measures and 14 performance factors.

—Nancy A. Lang

Total E-Commerce Sales

(in billions)

Year	Sales
2000	$488.70
2001	$864.10
2002	$1,411.30
2003	$2,817.20
2004	$3,189.00

U.S. e-commerce—both B2B and B2C—will grow from just under $500 billion this year to more than $3 trillion by 2004, according to Forrester Research. That figure represents close to 50 percent of the worldwide total of $6.8 trillion.

E-Marketplace Evolution

The e-marketplaces of tomorrow will propel dynamic pricing models to new levels of sophistication and flexibility, according to a report by Forrester Research. Forrester projects these real-time trading models, such as auctions and exchanges, will grow 25-fold over the next five years, reaching $746 billion in 2004.

As e-marketplaces evolve over the next three years, companies will match purchasing requirements to appropriate dynamic auctions and automate recurring bidding decisions. They'll also define preferences for attributes other than price, such as quality, warranty service, and credit. In addition, they'll be able to offer bidding advantages to preferred partners.

The number of participating suppliers will grow, causing margins to tighten. And with deals materializing and evaporating with one click, buyers will have to develop new methods of evaluating the ever-changing mix of suppliers. *—N.A.L.*

A Match Made in IT Heaven

A new breed of e-marketplace is bringing together buyers and sellers of IT services. These marketplaces are generally free to users, while vendors pay a commission.

One recent entry, Cofix (www.cofix.com), lets businesses track and manage IT service contracts and assets, and procure services from vendors. "We're a value-added matchmaker," says Max Seybold, chief executive of Cofix. At press time, the company had 6,000 corporate accounts and 375 service providers. A typical user is a company with 20 employees and no IT administrator.

Here's how it works: After you enter asset information into the Cofix Power Tools application, you can maintain a service history of the equipment and receive notification when service contracts expire. You can even order labels to identify each asset.

Cofix's SmartMarketplace feature lets you complete a "needs analysis" for each asset, compare offerings of various IT vendors, buy packaged services, or request a custom service plan. The SmartMarketEngine finds a package that already exists and generates a request for quote (RFQ). Sellers pay a 10 percent commission.

Another site focusing on comparing IT solutions is eJigsaw.com. "It normally takes a company eight weeks to search, compare, and evaluate IT solutions," says CEO Raghu Viswanathan. "We chop it down to 5 minutes."

The site tracks products across 16 solution channels. Of these, eight are IT solution providers, with ASPs and e-commerce being the most popular. "We don't evaluate the solutions," says Viswanathan. "We try to give you as many tools as you need to make that decision yourself."

The site went live in May; at press time, it had 4,000 vendors and 7,000 solutions. Vendors pay an annual subscription fee of $5,000. That includes an unlimited number of referrals and the ability to post press releases and white papers. For an extra fee, members can pay for positioning at the top. EJigsaw.com targets companies that range from 50-plus employees all the way up to the enterprise level. *—N.A.L.*

Cofix brings together buyers and sellers of IT services.

ILLUSTRATION BY WILLIAM RIESER

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- 2X AGP 8MB ATI Rage Pro 3D Video
- 3D Surround Sound
- Built-In Touchpad Pointing Device
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Pictured above, the Solo® 5300 (left), Solo 1150 (right) and Solo 9300 (top).

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$1399 or as low as $39/mo. (APR 14.9%) for 48 mos.[4]

with Gateway Cyber:)Ware

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$1999 or as low as $56/mo. (APR 14.9%) for 48 mos.[4]

with Digital Photo Workshop

Digital Camera, CorelDRAW™ 9 Software, Corel Print House™ Magic, Corel Print Office,™ Premium Photo Paper, Three-hour "Using Your PC With Digital Photography" Course (Instructor-led training at a Gateway Country store[5]), Getting Started Guide - $449

Gateway Solo 9300CL

15" XGA TFT Color Display • Intel Pentium III Processor 700MHz • 64MB SDRAM • 10GB Ultra ATA Hard Drive • 8X DVD-ROM Drive • V.90 56K^2 Modem • 2X AGP 3-D ATI Rage™ Mobility-MI w/ 8MB SDRAM • Microsoft Windows Millennium Edition • MS Works Suite 2000 Software • 1-Year AOL Internet Access[3]

$2699 or as low as $75/mo. (APR 14.9%) for 48 mos.[4]

with Digital Creator Pack

Nomad® II Digital Audio Player, MusicMatch Jukebox Plus Software, Three-hour "Using Your PC to Explore Digital Music" Course (Instructor-led training at a Gateway Country® store[5]), Getting Started Guide - $449

intel inside
pentium®///

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# of any one of our custom-built systems shown here:[1]

Gateway™ Performance 933

Intel Pentium III Processor 933MHz • 128MB PC133 SDRAM • EV700 17" Monitor (15.9" viewable) • 32MB NVIDIA™ RIVA TNT2™ 4X AGP Graphics Accelerator • 30GB UATA100 7200 RPM Hard Drive • 16X DVD-ROM Drive • Sound Blaster® Live!™ Value Card • Boston Acoustics® BA735™ Speakers • 56K[2] PCI Voice Modem • Microsoft Windows Millennium Edition • MS Works Suite 2000 Software • 1-Year AOL Internet Access[3]

$**1999** or as low as $56/mo. (APR 14.9%) for 48 mos.[4]

with Extreme Audio Pack

CD-RW (CD Rewritable) Drive, CD Stomper Pro Labeling Kit, Nomad II Digital Audio Player, MusicMatch Jukebox Plus Software, Three-hour "Using Your PC to Explore Digital Music" Course (Instructor-led training at a Gateway Country store[6]), Getting Started Guide - $429

Gateway Essential 733

Intel Pentium III Processor 733MHz • 64MB SDRAM • EV700 17" Monitor (15.9" viewable) • Intel® 3-D Graphics • 15GB Ultra ATA Hard Drive • 48X max/20X min CD-ROM Drive • Enhanced Audio • Boston Acoustics® BA265™ Speakers • 56K[2] PCI Voice Modem • Microsoft Windows Millennium Edition • MS Works Suite 2000 Software • 1-Year AOL Internet Access[3] • Free Microsoft Reference and Productivity Bundle (through 9/17/00)

$**1199** or as low as $34/mo. (APR 14.9%) for 48 mos.[4]

with Electronic Photo Album

Visioneer® OneTouch™ 7600 USB Scanner, CD-RW (CD-Rewritable Drive), Corel Print House Magic, Corel Print Office, CD Stomper Pro Labeling Kit, Three-hour "Using Your PC With Digital Photography" Course (Instructor-led training at a Gateway Country store[6]), Getting Started Guide - $349

Gateway Profile™ 2 CX

15.1" XGA TFT Color Display • Intel Celeron Processor 500MHz • 64MB SDRAM • 20GB Ultra ATA Hard Drive • 6X DVD-ROM Drive • 56K[2] Modem • MS Windows 98 Second Edition • MS Works Suite 99 Software

$**1899** or as low as $53/mo. (APR 14.9%) for 48 mos.[4]

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the Stuff you want

big music, small files

MP3, get ready to rumble. Microsoft's Windows Media Format, a digital-music data-compression codec that delivers comparable audio at half the size of MP3 files, is hitting the market in new portable audio players that support this file format alone. The first of these is the $149.99 **Win-Jam** from I-Jam Multimedia. This stylish 5.6-ounce pocket audio player features two memory slots that support flash-memory or ROM MultiMediaCards (it ships with a single blank 16MB card) and comes with a DC adapter for wall outlets or car cigarette lighters. The unit also includes Microsoft's new Windows Media Player 7 software on CD-ROM, so you can download your music from your PC using the included USB cable.

I-Jam Win-Jam Digital Audio Player
I-Jam Multimedia
Schaumburg, IL; 888-326-4526
www.ijamworld.com

featherweight filming

Sony is pushing digital video to new extremes of portability with its minuscule $1,499 **DCR-PC5 Handycam,** which measures a mere 4x2.1x3.9 inches, weighs only 15 ounces, and saves video to a mini digital video tape. A spacious 2.5-inch color LCD lets you frame shots and also serves as a touch-screen control pad. The camera features Super SteadyShot picture stabilization, 16-bit stereo sound, and an i.Link high-bandwidth digital video interface for shuttling your files swiftly to computer. It also ships with a 4MB Memory Stick memory card, which can stow up to 60 compressed JPEG snapshots.

Sony DCR-PC5 Handycam
Sony Electronics
Park Ridge, NJ; 800-222-7669
www.sony.com

well-stocked wallet

Pack plenty of media files in your pocket with the palm-size $499 **Minds@Work Digital Wallet**. This device, available in gray or cool translucent blue, houses a 6GB internal hard drive that can store just about any kind of file—and lots of them. For instance, it handles 6,000 high-res digital photos, 110 hours of digital audio, or 6,000 200-page novels. The tiny 12-ounce device is outfitted with a small monochrome LCD that allows for viewing and managing your files, as well as a standard USB port for linking with a PC.

Minds@Work Digital Wallet
Minds@Work
Irvine, CA; 800-459-5799
www.mindsgear.com

parent trap

Kids love high-tech gadgets almost as much as they love to keep meddlesome adults at a safe distance. So let your young ones curb snooping with the new $14.99 Spy Detectors from Wild Planet Toys. This motion-alarm and spy-trap set lets young sleuths have some fun and prevent the rest of the family from messing with their stuff. A door alarm keeps intruders out by sounding when an invisible light beam is crossed. A second device features a highly sensitive motion detector that emits an alert if it registers the slightest vibration.

Wild Planet Spy Detectors
Wild Planet Toys
San Francisco, CA; 800-247-6570
www.wildplanet.com

brainy trainer

Here's a device that's cheaper than a personal trainer and a lot smarter, too. The $99 SportBrain Starter Kit electronically tracks your daily physical activity and uploads it to a Web-based database that then offers pointers specific to your performance. The 0.8-ounce device can be worn on a belt or waistband and automatically records data such as calories burned, miles and steps traveled, and speed. You then plug the unit into the included SportPort docking station for upload and analysis.

SportBrain Starter Kit
SportBrain
Sunnyvale, CA; 888-235-9608
www.sportbrain.com

hands-free chatter

Lose your mobile phone's unsightly headset cord and strap on the wireless HBH-10 Mobile Headset from Ericsson. Debuting later this year for less than $500, the HBH-10 lets you jabber away up to 30 feet from your cell phone. This head-mounted mic and earpiece uses the long-awaited Bluetooth wireless technology. Initially, you'll only be able to use the headset with the T28 model from Ericsson, which will require a separate adapter, but a number of Bluetooth-enabled phones will crop up in the coming months.

Ericsson HBH-10 Mobile Headset
Ericsson Mobile Communications
Research Triangle Park, NC; 800-374-2776
mobile.ericsson.com

e-Business
made e-Z.

Gateway@Work SM

Welcome to Gateway eServices.

e-SSENTIALS

Professional Web Site Hosting and eCommerce Solutions

Making your presence felt on the Web is serious business. But that doesn't mean it needs to be expensive or complicated. Gateway makes it easy and affordable to get your business online. Whether you're a Web novice just getting started, or a seasoned veteran looking for better value, we can provide all the power, security and functionality you need, with plans to meet every kind of site and every budget.

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Gateway's Intel®-powered GP-Series Professional PCs are the tools you need to maximize your eBusiness potential. These network-ready PCs provide your business quick-access to the Internet and provide you with eCommerce opportunities.

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Network-ready desktops focused on delivering outstanding performance and value

Intel® Pentium® III Processor 733MHz • 64MB SDRAM • 7.5GB Hard Drive • Intel® 3-D AGP Graphics • EV500 15" Monitor (13.9" viewable) • 20X min/48X max CD-ROM Drive • Integrated Audio 10/100 Ethernet • Microsoft® Windows® 98 • MS® Works Suite 2000 Gateway™ Go Back™ Standard • 3-Year Limited Warranty[1]

$999 or
$35/mo. 36 mos.
business lease[2]

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$1399 or
$49/mo. 36 mos.
business lease[2]

Ad Code: 001805

call 1-888-217-4955, click www.gateway.com/eservices/shopper
or visit a Gateway Business Solution℠center at a Gateway Country® location

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Along with all the benefits of our Enhanced Web Site plan, you get higher data transfer rates, more email options and additional disk space.

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Fire up our Premium plan with incredible storage and data transfer capabilities, and 100 email accounts.

eCommerce Solutions

Basic Store   **$29.95/mo.**
This low-cost, do-it-yourself online catalog is ideal for merchants who sell up to 10 items or complete up to 100 credit card transactions per month.

Enhanced Store   **$49.95/mo.**
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Premium Store   **$89.95/mo.**
Place an unlimited number of products online and process sales automatically using real-time credit card authorization services provided by ATS Bank, Cybercash or PaymentNet.

High Volume Store   **$119.95/mo.**
A sophisticated eCommerce solution that offers unlimited transaction processing and real-time credit card authorization via a link to a Processing Service Provider, such as ATS Bank, Cybercash or PaymentNet.

Gateway™ Solo® 3300 Ultraportable
Ultrathin, Ultralight Notebook
Intel® Pentium® III Processor 500MHz • 3.65 Pounds 1"Thin • 12.1"TFT SVGA Color Display • 64MB Memory 6GB Hard Drive • Integrated V.90 Modem[4] • Integrated 10/100 Ethernet • 1-Year Limited Warranty[1]

$2199 or
$76/mo. 36 mos.
business lease[2]

Gateway@Work

Gateway recommends Microsoft® Windows® 2000 Professional for business

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To build a successful business Web site, you need to define your business goals. From your portable or desktop, you can participate in online training that helps you determine everything from your Internet business to promotion and design strategies. Our $99 Online Training Subscription covers the following:

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- HTML Programming
- Cold Fusion
- Internet Advertising
- Adobe® PageMaker™ 6.5

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Flexible high-performance managed PC

Intel® Pentium® III 733MHz Processor with 512K Cache • 128MB 133MHz SDRAM • 16MB ATI RAGE™ 128 ProGL AGP Video Card • S.M.A.R.T.™ II Ultra ATA Hard Drive • VX720 17" Monitor (16" viewable) • 20X min/40X max CD-ROM Drive • 5-Bay Highly Serviceable, Convertible Case • Intel® LANDesk® Client Manager Software Version 6.0 MS® Windows® 2000 Professional • 3-year Limited Warranty[1]

$1699 or
$60/mo. 36 mos.
business lease[2]

Tracking Results

You determine the success of your Web site by tracking the amount of regular traffic, or "hits," you receive daily. This usually depends on how often you maintain the content on your site – product information, promotions or newsworthy events. All of Gateway's Professional Web Site Hosting plans and eCommerce Solutions include measurement tools, such as WebTrends, to let you see:

- Total number of "hits" or visits to your Web site
- Which Web pages are most frequently viewed
- What type of Web browsers are most commonly used by visitors to your site (Netscape®, Internet Explorer®, etc.)

Gateway 6400 Server

Entry-level server that delivers exceptional value and performance for today's networked environments

Intel Pentium III Processor 733MHz with 256K L2 Cache • Two Intel Pentium III Processors • 64MB of PC133 ECC SDRAM • 9GB Ultra160 SCSI Hard Drive Integrated Dual Channel Ultra160 SCSI Controller • Integrated Intel® 10/100 Ethernet • 4MB Integrated PCI Graphics • New 9-bay Highly Serviceable Minitower Chassis • HP® OpenView™ ManageX Event Manager • 3-Year Limited Warranty[1] • FCC Class A Emission Standard[5]

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$60/mo. 36 mos.
business lease[2]

Ad Code: 001805

intel inside
pentium® III

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center at a Gateway Country® location

Gateway@Work

Gateway recommends Microsoft® Windows® 2000 Professional for business

1. Visit gateway.com, call 1-800-846-2000 or write to Gateway Terms & Conditions, P.O. Box 1951, North Sioux City, SD 57049-1951 for a free copy of applicable limited warranties and service agreements.

HOT GEAR

pixel instamatic

Fusing the versatility of a high-resolution digital camera with the instant gratification of a built-in photo printer, the $799 **Olympus C-211 Zoom** lets users turn out hard copies of digital images directly from the camera in less than a minute. The C-211 supports a maximum 1,600x1,200 resolution and saves standard JPEG and TIFF files to SmartMedia removable memory cards. The camera ships with an 8MB storage card and uses Polaroid 500 instant print film, which you can get in a 10-pack for $9.99.

Olympus C-211 Zoom
Olympus America
Melville, NY; 800-622-6372
www.olympusamerica.com

plastic protection

Want to preserve business cards, photographs, or ID documents for posterity? The slick new $34.99 **You2 Cool-Seal Laminator** from Leitz provides a great way to shield them from the wear and tear of time. Just place your document into a Cool-Seal Pouch, then feed the pouch into the You2. You can trim away excess laminate, leaving a custom-fitting seal, even for uniquely shaped items. The device is compact and requires no power supply, so take it anywhere.

Leitz You2 Cool-Seal Laminator
Leitz
A division of Esselte
Garden City, NY; 516-741-3200
www.esselte.com

pocket presentations

The race to produce the smallest multimedia projector is heating up with the new **UGO S-Lite** and **X-Lite** models from Philips. Both weigh a feathery 2.9 pounds and deliver 800 ANSI lumens of brightness—more than enough illumination for most boardrooms. The $4,999 S-Lite supports a maximum SVGA native resolution, and the $6,999 X-Lite handles XGA. Both feature digital freeze and zoom, keystone correction, and USB remote-cursor control. Their sleek, ultrastrong magnesium cases are the key to their light weight and good looks.

Philips UGO S-Lite and X-Lite
Philips Consumer Electronics
Atlanta, GA; 888-873-4672
www.pcstuff.philips.com

HOT GEAR

pint-size PDA

Not since the debut of the Rex organizer have PDAs shrunk to the surprising size of the new $59.99 Vista from Royal. This itty-bitty card-size device features address, calculator, schedule, and expense-management software, and accepts data input with its built-in EZTouch keys. If you find the Vista's keys too small, plug in the included pocket-size detachable keyboard. The device syncs with popular PIMs and ships with a folding wallet-style case that does double duty as a business-card holder.

Royal Vista
Royal Computer Business Products
Bridgewater, NJ; 908-429-4357
www.royal.com

the new sound

Bursting on the scene as the first Secured Digital-compatible player available, the $499.99 Toshiba MEA110 supports Matsushita's new Secured Digital (SD) memory-card technology. The sleek 2.7-ounce MEA110 player packs 64MB of internal memory, which holds about an hour of CD-quality music, and has a slot that accepts an SD memory card for up to 64MB of additional storage. The player connects to your PC over USB and ships with a cable, music-management software, and stereo headphones.

Toshiba MEA110
Toshiba America Consumer Products
Wayne, NJ; 800-631-3811
www.toshiba.com/tacp

it's in the bag

Geeks need not be fashion nerds. Instead, carry your notebook computer and all your other gizmos around in style with the new $59.99 Crypto Laptop Case, a slim shoulder bag with plenty of attitude. It's available in four eye-catching colors including the very cool silver. The padded nylon case measures a compact 13x11x5 inches and features utility hooks, document flaps on the front and back, and a cushioned interior. It also offers a business-card holder, an internal zippered pocket, and two front pockets for a cell phone and handheld organizer.

Crypto Laptop Case
Bolt
New York, NY
www.bolt.com
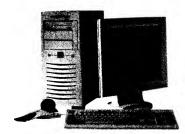
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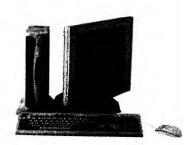
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Dell™ Latitude™ Notebook   Dell™ PowerEdge™ Server   Dell™ PowerEdge™ Server

EXPLODE.

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Population of your town: 534,000. Population of World Wide Web: estimated at 300,000,000 (and counting). Maybe you should move your business online. Our hosting packages are not only an incredible deal, they're supported by Dell™ PowerEdge™ servers and PowerApp™ server appliances featuring Intel® Pentium® III processors. (And we know about the importance of network uptime.) Dell Internet Services offers everything from basic hosting to full-blown E-Commerce solutions on dedicated servers. Plus, we have a whole slew of tools to help you build, maintain, and promote your site. With Dell Internet Services, you'll get your business burning on the Web in no time. (Is it hot in here?)

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- Domain name registration for $25/year
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2. HOST YOUR SITE WITH AN E-COMMERCE LEADER

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- 30-day Money-back Guarantee[37]
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$14.95/mo.

PLUS $20 ONE-TIME SETUP FEE

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- 1X 9GB[5], 7.2K SCSI Hard Drive
- 2X 10/100 Embedded NICs
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- Dedicated 21GB Monthly Transfer (Metered)
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$199/mo.

PLUS $350 ONE-TIME SETUP FEE

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COMPUTER SHOPPER

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Dell Dimension 4100

DESKTOPS

Dell Dimension 4100
A midprice home PC with superior performance

With Intel's new 815E chip set under its hood—alongside an 800MHz Pentium III processor and 128MB of 133MHz SDRAM—Dell's $1,839 Dimension 4100 represents an excellent balance between price and performance. Factor in the Dimension's abundant expansion capabilities and Dell's time-proven service and support, and you've got a real winner.
(See review on p. 96.)

Dell Computer Corp. • *www.dell.com* • 800-388-8542

MOBILE

Compaq Armada M300
Heavyweight notebook performance in a lightweight package

This ultraslim notebook weighs only 3.4 pounds and features a fast 600MHz Pentium III processor, a 12GB hard drive, and built-in Ethernet support. The optional docking station, meanwhile, adds a CD-ROM, LS-120, or DVD-ROM drive; a second battery; audio-in and -out jacks; and more. For business travelers with tired backs and heavy workloads, the Armada M300 can't be beat.
(See feature on p. 130.)

Compaq Computer Corp. • *www.compaq.com* • 800-888-9909

Creative Nomad II MG
The best way to listen to MP3s on the move

Like the original Nomad, the magnesium-encased Nomad II MG packs 64MB of memory, an FM radio tuner, and a voice recorder into a delightfully tiny form factor. But this new $399 unit also features a USB docking cradle, 32 FM station presets, and a radio-record function. Plus, it can be upgraded to support future audio formats.
(See review on p. 119.)

Creative Nomad II MG

Creative Technology • *www.nomadworld.com* • 800-998-5227

Dell Inspiron 5000e
A desktop-replacement system with all the comforts of home

With its stunning 1,400x1,050-resolution, 15-inch screen, Dell's new Inspiron is a DVD movie lover's dream. A fully loaded desktop-replacement system with a 750MHz Pentium III, 128MB of SDRAM, a whopping 30GB hard drive, and more, the Inspiron 5000e delivered some of the best benchmark scores we've ever seen.
(See review on p. 114.)

Dell Computer Corp. • *www.dell.com* • 800-917-3355

RECENT WINNERS

DESKTOPS

ABS Performance 3
(August) The $1,299 price of the Performance 3 connotes value, but the inclusion of a GeForce 256-based graphics card, 20.5GB hard drive, and three-piece Altec Lansing speaker system makes it clear this 667MHz Pentium III desktop is not your typical budget system.
ABS Computer Technologies
www.buyabs.com • 800-876-8088

MOBILE

Compaq Notebook 100
(September) A low-cost laptop with surprisingly few compromises, the $1,299 Notebook 100 comes standard with a 475MHz AMD K6-2 processor, 64MB of RAM, a 12.1-inch active-matrix screen, and a 5GB hard drive.
Compaq Computer Corp.
www.compaq.com • 800-345-1518

micronpc.com TransPort ZX
(August) This 700MHz Pentium III portable speed demon delivers blazing performance, no-nonsense components, and outstanding

battery life, all for $2,999 direct.
micronpc.com • *micronpc.com*
888-224-4247

Shadowpack
(August) A free service for PDAs, two-way pagers, and Net phones, Shadowpack helps you warehouse your personal information in ways that pay off in more personalized content and faster online shopping.
Shadowpack • *www.shadowpack.com*
800-432-6201

HARDWARE
Elsa Gladiac
(September) The $329 Gladiac is second to none when it comes to offering the highest frame rates, resolution, and color depth possible for today's demanding 3D games.
Elsa • *www.elsa.com* • 800-272-3572

Hitachi CM771
(September) The world's first flat-face, Invar shadow-mask CRT monitor is as easy on your eyes as it is on your wallet. Priced at about $447, the 19-inch Hitachi CM771 gives you

outstanding sharpness and brightness as well as a refreshingly straightforward control set.
Hitachi America • *www.hitachidisplays.com*
800-441-4832

Lexmark Z52 Color Jetprinter
(August) You can't ask much more from a color inkjet printer than fast print speeds, beautiful-looking output, and a thrifty approach to consumables. The Lexmark Z52 offers all of this, and its low $179 price makes it a bargain as well.
Lexmark International • *www.lexmark.com*
888-539-6275

Nikon Coolpix 990
(August) Nikon's newest Coolpix is not only one of the least expensive 3.3-megapixel cameras available, it's also one of the best. *Its*

Palm m100
A Palm for the masses

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(See review on p. 120.)
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(See review on p. 106.)
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(See review on p. 128.)
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JOHN BLACKFORD
EDITOR-IN-CHIEF

No Requiem for Moore's Law

Will technology keep extending processor capacity and bandwidth? Does it even matter? Yes, yes, and yes.

THESE DAYS, COMPUTERS RUN SO FAST THAT WORRIES OVER computational limits pale before concerns about sufficient bandwidth to deliver advanced Web services. Still, chip designers have not been able to guarantee continuous advances much beyond 2010, when integrated circuits will approach fundamental limits.

Three issues will constrain next-generation (and beyond) computing and communications: the CPU and related components, bandwidth to link individual PCs and intelligent devices, and the applications computers can deliver.

It would be premature to speculate about all this—except that advances just announced suggest that processor and bandwidth limits *will not* constrain progress for at least 20 years. This raises provocative questions about what we'll do with all those MIPS.

FASTER PROCESSORS, BIGGER PIPES

For 36 years, Moore's Law has accurately predicted a doubling of transistor density every 12 to 24 months in integrated circuits. Intel's latest processor, the Pentium 4, delivers 1.5GHz with 42 million transistors—enough horsepower to drive streaming video on the Web, real-time video encoding, 3D visualization, speech recognition, and voice over IP. Clearly, today's high-end processors are capable of handling sophisticated computational tasks.

On the cable side, the issue is more about deployment than technology, because fiber-optic cables and routers can move truly stunning amounts of data. The optical advantage stems from the fact that photons are without mass, unlike electrons. With optical cable, there's no set limit to the number of photons you can cram into a particular fiber, while only a certain number of electrons can use a single circuit.

In fact, one bottleneck for optical communications at present is that the fibers pass through standard electronic processors for amplification and switching. Had those circuits been optically based, communications today would face even fewer constraints.

Optical fiber handles vast amounts of data by multiplexing several wavelengths of light into a single fiber. On the backbone side, providers this year expect to install fibers able to deliver 40Gbps per wavelength, or the equivalent of 750 complete channels of streaming video. Each fiber can handle eight or more wavelengths, and cables hold 100 or more fibers per cable. In

round numbers, trans-Atlantic-type cables deployed in the near future will be able to transmit the equivalent of nearly 1 million simultaneous television channels. Routers and switches being deployed can handle a similar load.

It's where the backbones step down to individuals that bottlenecks occur. At present, many Web users have no choice but to employ analog phone lines. Over the next few years, DSL, cable, and satellite providers will boost the bandwidth for home users by a factor of 10. In the long term, communications bandwidth will be a function of economics, not technology.

On the CPU side, road maps from chip makers suggest that by 2010 we'll see at least 10GHz CPUs, with circuit widths as low as 0.05 micron. Many designers believe that delivered computer power will be 100 times that of today's 1GHz CPUs—not the mere tenfold increase implied by the clock-speed advances alone—because of greater parallelism and more sophisticated processor architecture.

With such hardware, we'll see widespread use of virtual personalities in all kinds of man-machine interfaces, such as virtual travel agents or training instructors.

However, a recent breakthrough just announced by IBM pushes projections for circuit widths to 0.01 micron (10 nanometers) and below. The advance, known as V-Groove, allows circuits to be etched in a V-shape, reducing electrical crosstalk. Even without the help of optical, molecular, or atomic computing, that takes us beyond common-sense projections and into a realm in which computer power is sufficient to tangle with issues such as which capabilities are uniquely human.

MAN OR MACHINE?

After deploying the full range of multimedia, we'll move to continuous speech recognition and real-time translation, plus Web-linked e-paper and advanced medical diagnostics. These advances will only get us to 2010. Since we can now project beyond the year 2020, we expect by then CPUs of 100GHz or faster, with terabytes per second delivered to the home.

That's when we'll see machine capabilities begin to overlap human ones. By 2020, computer and communications technology will be embedded everywhere, not just in toasters and televisions, but also in floors, sidewalks, and roads. And these entities will be constantly connected to the Web. Computer-aided devices will provide sight to the blind and hearing to the deaf; artificial personalities will participate in nearly all routine activities, such as travel reservations, shopping, and information seeking. Eventually, computer technology may be implanted in humans, for the ultimate "always-on" experience.

In short, the next couple of decades are likely to be the start of a wild ride. Want to come? ***john_blackford@zdnet.com***

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JOHN DVORAK

Phone System Of the Future

A transceiver on your rooftop may soon bring you free local phone service.

IT WAS DURING A CONVERSATION WITH BRITISH TELECOM'S CHIEF technologist, Peter Cochrane, that I learned of an interesting plan: Make all local calls free and make the phone like a TV set—something you buy once and use for free as often as you like. The technology I'm about to describe is not unknown. Variations exist in both Japan's Personal Handy Phone System and the Metricom Ricochet Internet radio modem send-and-receive system, whose numerous little send/receive boxes placed hither and yon move data and call traffic from point A to point B.

This new scheme is somewhat different. The Personal Handy Phone System, a variation on cellular technology, uses low-power mini-cells placed on telephone poles to link cell phones to the central office. A wire from the central office sends the signal from the mini-cell back to the central office, where it's routed to its destination. Cochrane's rooftop system is more interesting. These low-power boxes link standard phones rather than cell phones within a home or office (although I can envision variations that include cell-like features).

Cochrane describes it this way: A retailer—Wal-Mart, for instance—has a huge fiber link to a central store. It sells you a transceiver, which you put on the roof like a satellite dish. The unit hooks up all the phones in your home and sends the traffic by radio to the Wal-Mart receiver, which sends it to a switching router, into the fiber and off to some central office. A call costs next to nothing.

For this scheme to work the system must roll out as a radiant. In other words, nearby houses buy the first line of transceivers, then the next group farther away buys the next line. The transceivers between the store and the second wave of buyers act as repeaters to forward the data to the store. So the devices are multifunctional, acting as both transceivers and repeaters for other transceivers.

As long as you keep shopping at Wal-Mart, the phone link remains free. A shopping card would keep tabs on your buying habits. This works for other large retailers such as Costco, as well. As long as you're a Costco member, you get to use this free phone link—an interesting way to keep customers loyal. System maintenance becomes a marketing expense.

Two things make this work: the scads of available fiber out there, much of it coming in and out of corporations, and IP switching. Most telephony observers contend phone calls will eventually be free, and this rooftop transceiver system, with its Web-like

architecture, is an obvious way to reduce telephony infrastructure costs. Cochrane reckons the system would sell for about $300 and come with perhaps a year of free phone service. After that you'd continue getting free service as part of various customer-loyalty programs.

The most interesting aspect of this idea is that it changes the business model for local-loop phone service. Everyone wants to get into long distance because it's the most profitable part of commercial telephony. Although the Telecommunications Act of 1996 was designed to make phone services more competitive, it just made long-distance services a bit more competitive. Nothing's been done to make local phone service competitive, no matter what the promises. Most people around the country have one choice unless they go to cellular. A network of rooftop transceivers changes this model rapidly.

SWITCHING SERVICE SHOULD BE SIMPLE

Right now, at least two rooftop systems are in the planning stages. Nokia has bought one of the technologies, Siemens the other. Plus, it's rumored a lot of venture money is going into other schemes. This technology will benefit from a single standard, so more than one vendor can support the transceivers. Say you're receiving service from Wal-Mart and find you can't sustain the minimum required purchases to keep the system free. It would be nice to switch to another service provider without having to swap out equipment.

With microelectronics becoming so inexpensive (as governed by Moore's law), this kind of scheme is quite plausible. Phone companies would feel the impact, but they could also be the service providers if they sold the transceivers and some premium services for a flat monthly fee.

From a marketing perspective, this is similar to television. You can watch broadcast television for free, but the services, reception, and extra channels you get from cable and satellite make them worth the money. The phone companies should look at this analogy closely. They can charge a monthly fee for service, in addition to the $300.

There's some irony in how cable companies have been trying to think like phone companies with no success. Here's where phone companies can think like cable companies and do very well for themselves. *dvorak@dvorak.org*

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The Sale
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Without price as a draw, e-tailers are incorporating the strengths of offline retailers.

ONLINE SHOPPING'S EXTENDED GRAND-OPENING SALE IS over. Since the first-quarter stock-market correction, dot-com companies have been succumbing to cash constraints. Among the casualties are online toy stores toysmart.com and ToyTime.com. In addition, Hollywood Entertainment recently announced it could no longer sustain Reel.com's e-commerce infrastructure and would turn fulfillment responsibilities over to buy.com. And at press time, Oxygen Media announced it would close two shopping sites targeted to women, and iVillage was in talks to sell its iBaby shopping site to Babygear.

For shoppers, this has meant steadily rising prices at e-tailers weathering the shakeout. Even more noticeable for veteran online shoppers has been the absence of once-plentiful coupons and loss-leading deals. "I'm going to miss buying DVDs subsidized by VC [venture capital] money," read a posting on the *alt.video.dvd* newsgroup the week Reel.com closed its e-commerce operations. "Alas, it was good while it lasted."

THE ONLINE-OFFLINE CONNECTION

If price is no longer a draw, online shoppers will gravitate toward sites that offer other benefits, such as customer service and convenience. Many sites are using offline tactics to drive this point home for the holiday season.

Some sites are even offering print catalogs, a move frowned on as a tool of "legacy" mail-order houses by Internet purists a couple of years ago. But just as catalog vendors have successfully used online stores to attract shoppers, so-called "pure" Internet plays have begun recruiting seasoned executives from the catalog business to create catalogs of their own.

Catalogs offer the advantage of a long shelf life. Vendors often see sales spikes for more than a month after mailing, compared with 48 hours to a week with targeted e-mail campaigns. I've found myself browsing catalogs from companies like Eddie Bauer, Crate & Barrel, and Mrs. Fields, only to go to the Web site to place the order.

Contrary to earlier concerns, the Web has helped rather than hurt these businesses. This holiday season, I'm looking forward to getting the same convenience from e-tailers. I already receive circulars in my newspaper from Amazon.com. Around Father's Day, I received my first true catalog from an e-tailer—RedEnvelope, a seller of upscale private-label gifts. Food.com (restaurant takeout) and eZiba.com (handmade goods) are following suit. For the consumer, catalogs offer much better browsability than Web sites,

and they offer glossy product shots without the download lag time.

RedEnvelope—along with Victoria's Secret, macys.com, J.C. Penney, and Lands' End—provides a prominent sign-up form where visitors can register to receive a catalog. Think of this as "offline opt-in."

Private-label goods are another catalog specialty e-tailers are picking up on. E-tailers that sell other brands are now offering their own (often lower-priced) lines, the same way department stores offer their own lines of clothing. Ashford.com, for instance, recently rolled out its own collection of jewelry; Chipshot.com has its own golf clubs; and eToys will have its own line of children's furniture in the fall.

SERVICE IN THE SPOTLIGHT

Customer service is another offline strength e-tailers are beginning to incorporate. Barnesandnoble.com recently joined other "bricks-and-clicks" sites, including macys.com, Wal-Mart, Borders.com, and TowerRecords.com, in allowing shoppers to bring returns to the nearest retail location. The site has also expanded its same-day delivery service in Manhattan and—at least in my anecdotal experience—is delivering quickly.

It remains unclear whether such practices will force bricks-and-clicks sites to charge sales tax in all states in which they have retail stores, but recent Jupiter Communications research shows online shoppers don't mind paying the extra fee for items under $100.

Other customer-service gems include TowerRecords.com's policy of sending you a free jewel case if the one you receive is cracked. And Lands' End has long offered its "call-back" service, in which a representative calls once you submit your number online.

Not that integration between online and offline is always smooth. You still can't use your offline coupons on macys.com, for instance, and many online stores still don't tell you if something's out of stock until after you've placed your order.

THE BIG MONEY

Research analysts are urging pure-play e-tailers to partner with offline companies because of the benefits consumers perceive in using both channels. Jupiter's data indicates that for every dollar spent online, shoppers spend $7 offline as a direct result of the research they do on the Internet. Knowledge like this will force e-tailers to devise new ways to reach online shoppers when they're ready to buy. And that will require a new focus on service. Alas, bargain hunters, the sale may be over, but the mall is still open.   *jobrien_eshopper@mail.com*

ILLUSTRATION BY IVAN LEE SANFORD

MICHAEL SLATER

Where Are All The Web Pads?

Cost, capability, and market requirements have kept browser-focused tablet computers out of users' hands.

MORE THAN TWO YEARS AGO, VARIOUS COMPANIES BEGAN demonstrating prototypes of Web pads—tablet computers dedicated to Web browsing. With a wireless link to a base station, which in turn connects to a phone line or home network, a Web pad provides Internet access with none of the complexity of a personal computer. Plus, you can use it anywhere in the house, putting the Web where the people are, instead of where the computer is.

The Web-pad concept resonated with many people. It could make Web access as convenient as reading a newspaper, consulting a phone directory, or watching TV. Yet even though prototypes have been around for years, Web pads remain essentially unavailable. Three major issues have delayed them: cost, capability, and market requirements.

The most expensive component in a Web pad is the screen. Unfortunately, liquid-crystal displays (LCDs) are in very short supply. Given their limited manufacturing capacities, LCD makers prefer to sell larger, more expensive displays for notebook computers and desktop monitors. With demand for these products outstripping supply, there's little incentive to price smaller displays aggressively.

The supply constraint is due, in part, to the Asian financial crisis, which prompted most manufacturers to delay plans for new manufacturing plants. Many new plants are now finally under construction, but it takes years—and billions of dollars—for a new plant to begin production. The supply/demand imbalance isn't likely to get dramatically better this year, but in 2001 the situation could turn around.

Along with high costs, delivering a high-quality Web experience has proven surprisingly difficult. At first, it seemed Web standards such as HTML provided a new definition of compatibility that eliminated the need for Windows software or x86 processors in Web appliances. But the ever-changing browser plug-ins and evolving Web standards have made it tough to create browsers for Web pads that deliver a PC-quality browsing experience. The list of widely used plug-ins is surprisingly long, from streaming audio and video (RealAudio and Windows Media Player) to layout and graphics (Flash and PDF). If the browser isn't Microsoft Internet Explorer or Netscape Navigator, the operating system isn't Windows (or perhaps Macintosh), and the processor isn't x86 (or perhaps PowerPC), you need special versions of each plug-in.

Suppliers of these plug-ins have their hands full keeping up with the rapid pace of PC-centric Internet software, and because the installed base of Web appliances is tiny, there's little imme-diate incentive to invest in supporting them. And because the various appliance vendors are pursuing a range of technology strategies, there's no single Web-pad standard for plug-in suppliers to target. Furthermore, most plug-ins are written assuming lots of memory and a disk, which makes it hard to port them to the limited-memory world of the Web pad.

If the target market is those without computers who are looking to Web pads as an easy on-ramp to the Internet, it may be acceptable to forgo support for many plug-ins. This is the case with most Internet appliances so far, including Netpliance's i-opener and Microsoft's WebTV.

The problem is Web pads aren't cheap, and the most likely early market is not Internet neophytes but active Web users who've had PCs for years and like the idea of having an additional Web-access device at home. These users will demand a Web pad that delivers the same quality Web experience as their PCs.

WEB ACCESS ISN'T ENOUGH

Some prospective Web-pad marketers are concerned that even full-featured Web access isn't enough to get many people to buy a Web pad. These companies are working with partners to develop additional services that make Web pads more useful outside the home office. They're also seeking partners to subsidize the cost of the device by offering preset bookmarks and other forms of advertising.

Many early Web-pad developers have switched from RISC to x86 processors in order to gain easier access to plug-ins, and Transmeta has pitched its low-power x86 processor as an ideal solution for this market. Simply being x86-compatible doesn't solve the problem, though; the full set of plug-ins is available only for the Windows environment. Microsoft hopes to use this advantage to make the new Windows CE 3.0—for which a full IE 4 browser is available—the operating system of choice for Web pads.

All these factors combined mean you won't see a flood of Web pads this year. Some will ship this year, and if all goes well, many more will ship next year; then the flood could begin in 2002. Eventually, Web pads will be a major part of the computing landscape, but it's going to take a frustratingly long time.

michael@mslater.com

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SONY VAIO PCV-J100

Moviemaking
Moves to the PC

IF YOU BELIEVE THE MISSIVES FROM COMPUTER MANUFACTURERS, the filmmakers of tomorrow are cutting their teeth today on digital video for their PCs. Apple Computer has spent millions on ads designed to educate consumers about the joys of computer-aided video creation, and vendors are scrambling to adapt the concept to Windows-based machines. Among these, the Sony VAIO PCV-J100 is one of the least expensive and better-equipped systems for desktop video production. In addition to having the horsepower and software needed for video editing, the PCV-J100 has two IEEE 1394 (FireWire) ports for direct connections to digital camcorders.

As is typical for sub-$1,000 systems, the PCV-J100's $899-estimated price doesn't include a monitor. Our evaluation system came with a $229-estimated, 15-inch Sony HMD-A100/L monitor, which brought the total cost up to $1,128. Because a computer at this price can't use all top-shelf components, we were interested in how Sony tailored its choices for the target audience of consumers interested in plug-and-play video production.

The PCV-J100's 600MHz Celeron CPU and 64MB of SDRAM proved capable of handling the rigors of juggling multiple video clips simultaneously. Sony's choice of a 15GB hard drive is a bit disappointing, however. Though it should provide more-than-adequate storage for a general-purpose home computer, the drive may be undersized for some video projects.

The PCV-J100's best features are its two IEEE 1394 ports (called i.Link ports by Sony) and a generous selection of video-creation and video-editing programs. Having two IEEE 1394 ports makes it much easier to perform real-time editing with two different camcorders. You can also send video from one camcorder to another without having to copy the video to your hard drive first. The PCV-J100's bundled software includes Sony's MovieShaker, a simple video-editing program that automatically adds transitions, effects, and music according to a selected theme (such as "romantic" or "exciting"). Sony's DVgate, meanwhile, allows you to stream video between IEEE 1394-connected devices, and Adaptec's Easy CD Creator lets you archive your videos to a CD-R or CD-RW disc using the system's 8x/4x/32x CD-RW drive. The PCV-J100 also packs a 10/100Mbps Ethernet card and a V.90 modem.

So where did Sony cut costs to optimize this budget-priced system? In place of a dedicated graphics card, the PCV-J100 uses the Intel 810 chip set. For video editing as well as most typical applications, the graphics engine is sufficient. In fact, although a Business Winstone 99 score of 17.7 showed the PCV-J100 to be somewhat sluggish for a system with a 600MHz processor, the PC is still plenty powerful for most day-to-day tasks, such as word processing and Web surfing. If you plan to use the PCV-J100 as a family gaming system, however, you may be disappointed. We were unable to complete our 3D WinMark 2000 benchmark, which is designed to test the limits of a 3D-graphics engine. Still, when we tried several popular games, such as Quake III, The Sims, and FreeSpace 2, they all ran without a hitch—albeit considerably slower than would be typical for a system with a better 3D card. In addition, the PCV-J100's lack of an AGP slot limits your upgrade options to PCI-based graphics cards.

Instead of integrating a sound chip onto the motherboard, as is common with budget systems, the PCV-J100's audio is generated entirely through software emulation. Regretfully, this solution, paired with the two small Sony speakers, produced substandard sound quality. We wouldn't recommend this system if you plan to use it primarily for producing music videos.

No stranger to innovative product designs, Sony gives the PCV-J100 a *stylish*, high-tech look, with steel gray and metallic blue colors. The compact 12x6.7x14.4-inch (HWD) minitower case includes a hidden panel for the CD-RW drive, which opens and closes along with the drive tray. Inside the case, you'll find one of the four PCI slots still vacant and one empty internal 3.5-inch drive bay. The PCV-J100 comes with a one-year parts-and-labor warranty.

If you're looking for a home system that's capable of running the latest 3D games, you'd be better off considering a different (albeit probably more expensive) system. But if what you need is a relatively inexpensive way to get started with digital video production, the VAIO PCV-J100 should make your final cut. *—David English*

SYSTEM:
Sony VAIO PCV-J100
COMPANY: Sony Electronics
Park Ridge, NJ; 888-315-7669
www.sony.com/pc
AS TESTED: 600MHz Celeron; 64MB 100MHz SDRAM; 15GB hard drive; 8x/4x/32x CD-RW drive; integrated Intel 810 graphics chip set sharing up to 13MB of system RAM; 15-inch Sony HMD-A100/L monitor; Yamaha sound emulation in software; Sony two-piece speaker system; 56Kbps modem; 10/100Mbps Ethernet card; additional software
DIRECT PRICE: $1,128 (including monitor)

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DESKTOPS

DELL DIMENSION 4100

Computing in the Right Dimension

Best Buy
October 2000

FINDING THE RIGHT BALANCE OF PERFORMANCE AND PRICE in a multipurpose home PC can be a tricky endeavor for a system manufacturer. By basing its 800MHz Pentium III-equipped Dimension 4100 system on Intel's new 815E chip set, however, Dell Computer Corp. manages to combine great performance, solid components, sufficient expansion capacity, and the company's always-impressive array of support services in a moderately priced desktop system, selling for $1,839 direct.

The 815E chip set is similar in functionality to its higher-end cousin, the 820E. It supports a number of technologies relatively new to desktop systems, such as a 133MHz front-side bus, the Ultra ATA/100 drive interface, and 4x AGP graphics. One significant difference between the 815E and 820E is that the 820E is designed to work with RDRAM-based systems, while the 815E is geared for systems that use SDRAM. While RDRAM provides a modest performance boost over SDRAM, systems using the comparatively inexpensive SDRAM cost a lot less. The Dimension 4100 comes with 128MB of 133MHz SDRAM. Another difference between the 820E and 815E is that the 815E includes an integrated graphics accelerator, a factor that also has the potential to help hold down the cost of 815E-based systems. But the Dimension 4100 doesn't utilize the 815E's built-in graphics engine, shipping instead with an nVidia GeForce2 GTS-based graphics card with 32MB of DDR memory.

Though this graphics card kicks up the cost of the Dimension 4100 a few notches, it pays off mightily with excellent 3D graphics performance. The system's 3D WinMark 2000 scores of 171 and 133, at 800x600 and 1,024x768, respectively, represent some of the fastest 3D-graphics performance we've seen to date. In fact, the Dimension 4100's 3D performance is rivaled only by another GeForce2 GTS-based system: the Quantex SM933z, a much more expensive system, running a 933MHz Pentium III with an 820

chip set and 128MB of RDRAM. (See the September review "Computing With Class," p. 106.) The Dimension 4100 also puts out strong hard-drive and 2D-graphics performance, both of which contribute toward an impressive Business Winstone 99 score of 32.

The minitower case opens easily with a single thumbscrew and two squeeze tabs. Inside, you'll find three of the five PCI slots empty, as well as four vacant drive bays: one 3.5-inch internal bay, two front-accessible 3.5-inch bays, and one 5.25-inch front-accessible bay. We'd recommend populating the 5.25-inch bay with a CD-RW drive, which would add $199 to the system price.

The Dimension 4100 uses InterVideo's WinDVD software decoder/player for DVD playback. DVD movies appear particularly sharp, with no posterization or

time lags. The 17-inch Dell P780 monitor uses a Trinitron tube and provides a sharp, bright image. The audio subsystem consists of a three-piece Altec Lansing ACS340 speaker system and a Creative Labs Sound Blaster Live Value sound card. We found this combination great for listening to audio CDs and watching movies. Still, users looking to immerse themselves in sound would do well to spend the extra $60 to upgrade to the Harman Kardon HK595 speaker system, which gives you an extra pair of satellite speakers for the rear channel.

The software bundle includes Windows 98 Second Edition, Microsoft Works Suite 2000, and MusicMatch Jukebox 4.30. No games or DVD movies are included, so you can't immediately see the superb 3D-graphics or DVD-playback performance of which this system is capable.

Dell's 24-hour, live, toll-free technical support and outstanding Web-based support resources are at your disposal. The three-year warranty with one year of next-business-day onsite support can be extended to include three years of total onsite coverage for an additional $99. The support section of Dell's Web site uses your system's service-tag number to provide relevant support information quickly. You can also use the Ask Dudley wizard for help with technical questions. To add to your system, Dell's Gigabuys online store lets you choose from a wide range of accessories and upgrade options.

With the new 815E chip set under its hood, the Dimension 4100 is a paradigm-shifter. Now you can buy a reasonably priced home system that can run demanding 3D graphics and other applications at levels comparable to systems that cost much more. —*Bruce Brown*

★★★★
RATED 1 TO 5 STARS
👍 Excellent price and performance balance; good expansion capabilities; great service and support
👎 Minimal software bundle

SYSTEM:
Dell Dimension 4100
COMPANY:
Dell Computer Corp.
Round Rock, TX
800-388-8542, 512-338-4400
www.dell.com
AS TESTED: 800MHz Pentium III; 128MB 133MHz SDRAM; 20GB hard drive; 12x DVD-ROM drive; nVidia GeForce2 GTS-based graphics card with 32MB DDR memory; 17-inch Dell P780 monitor; Creative Labs Sound Blaster Live Value sound card; three-piece Altec Lansing ACS340 speaker system; 56Kbps WinModem; Microsoft Works Suite 2000; additional software
DIRECT PRICE: $1,839

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DESKTOPS ◄

CYBERPOWER ATHLON SPECIAL

An Athlon for
All Occasions

MOST PEOPLE RELY ON THEIR COMPUTERS TO DO FAR MORE than simply crunch numbers. For many of us, computers are an important means of communication and a source of entertainment. To that end, CyberPower's Athlon Special systems are designed with such flexibility in mind. We looked at a configuration based on an 800MHz AMD Athlon CPU and 256MB of 133MHz SDRAM, selling for $1,849 direct.

At the heart of the system is an ATI Rage Fury Pro graphics card with 32MB of onboard memory and video-in and -out capabilities. Although you'd probably never want to send the display of a business application, such as a word processor, out to a television (the image quality would be too poor), you could use the system's composite or S-Video output to watch a DVD movie or play a game on your big-screen TV. Not that there's anything wrong with the ViewSonic E790 monitor—its 18-inch viewing area, tight 0.22mm dot pitch, and sharp images make it a fine display. But when it comes to entertainment, bigger is always better—and if your television qualifies, the system's Rage Fury Pro allows you to take advantage of it.

Chances are you'll also be using your system to listen to music CDs and other audio applications. The Athlon Special assigns this task to a Creative Labs Sound Blaster Live Value card and an Altec Lansing ACS54 speaker system. Altec calls this five-piece speaker system the "PowerPlay Plus for Gamers," and it does a very capable job with game sounds. It's also pretty good with both movie soundtracks and music. We noticed, however, that the bass got a little muddy at higher volumes. But just cranking it down a bit solved the problem, and it was still loud enough to fill an average-size room.

CyberPower also packs an 8x/4x/32x Creative Labs CD-RW drive into the system. It's ideal for creating custom audio CDs, and when combined with the 16x Pioneer DVD drive, you'll do a lot less disc swapping. For the more practical-minded, you can also use the CD-RW for offline storage or even to back up your hard drive. CyberPower passed up the usual Adaptec Easy CD software in favor of Nero Burning ROM. The Adaptec software is easier to use, but Nero is more comprehensive when it comes to making full backups.

Once you're done gaming, watching movies, or creating and playing audio CDs, you might feel compelled to get some work done. The system scored a 28.8 on Business Winstone 99, which is right on target for an 800MHz Athlon-based computer, and more than fast enough for just about any mainstream business app you throw its way. In addition, the 34GB IBM hard drive provides plenty of room for a vast MP3 library, a dozen or so games, and a cartload of programs. The drive achieved a score of 7,200 on Business Disk WinMark 99, showing it to be one of the swiftest drives we've seen.

Perhaps the only significant fault with the system is its ATI graphics engine. While powerful enough for 2D apps, it can't compete with the likes of the nVidia GeForce family of graphics accelerators. Upgrading to a GeForce2 GTS-based graphics card will cost you an additional $159, and it would also mean you'd have to give up the video-in and -out ports.
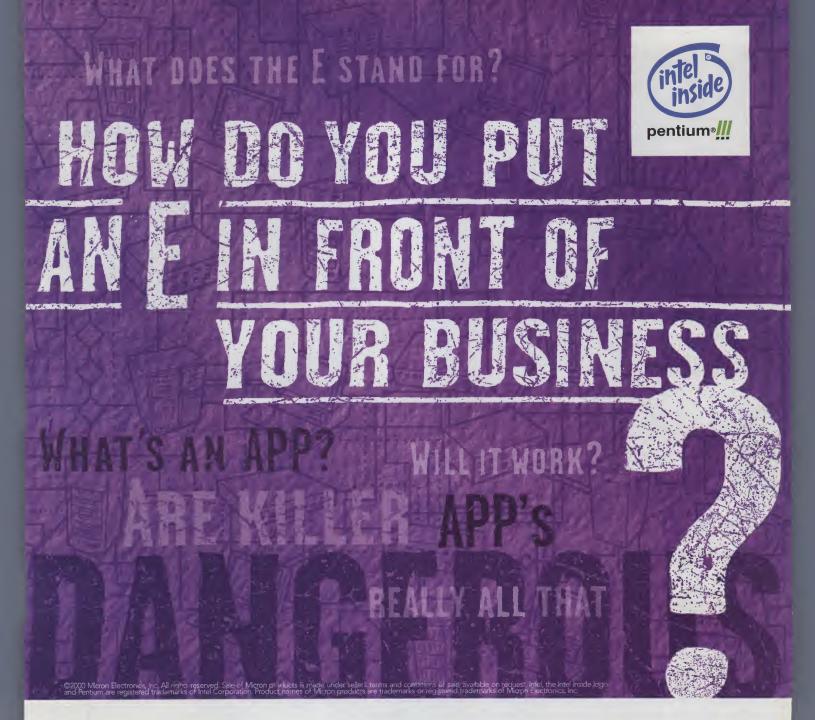
If you have occasion to open the 21x7.5x17-inch midtower case, you'll need to exercise some care: An exhaust fan is attached to the side panel with only about 18 inches of wire tracing back to the power supply. Two 5.25-inch and one 3.5-inch accessible drive bays remain vacant. Also, three of five PCI slots and a PCI/ISA shared slot are available for expansion.

CyberPower provides 24/7 customer support and backs the Athlon Special with a three-year parts-and-labor warranty with one year of onsite support. You can upgrade to two years of onsite coverage for $59, or three years for $99.

For under $1,850, CyberPower has assembled a powerful multipurpose system that should easily exceed the needs of all but the most demanding users. And because all of CyberPower's systems are customizable, even hard-to-please consumers should be able to configure a system to their demanding specifications.

—*Bill O'Brien*

★ ★ ★ ★
RATED 1 TO 5 STARS
👍 Great application and hard drive performance; excellent multimedia components
👎 Disappointing 3D performance

SYSTEM:
CyberPower Athlon Special
COMPANY: CyberPower
Baldwin Park, CA; 800-707-0393
www.cyberpowerinc.com
AS TESTED: 800MHz AMD Athlon; 256MB 133MHz SDRAM; 34GB hard drive; 16x DVD-ROM drive; 8x/4x/32x CD-RW drive; ATI Rage Fury Pro graphics card with 32MB SDRAM; 19-inch ViewSonic E790 monitor; Creative Labs Sound Blaster Live Value sound card; five-piece Altec Lansing ACS54 speaker system; 56Kbps voice modem; Utobia Remote Eyes Internet Camera; Corel WordPerfect Office 2000; additional software
DIRECT PRICE: $1,849

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Photo Printing at
A Pretty Price

PERHAPS THE ONLY OBSTACLE PREVENTING THE digital-photography revolution from taking on global proportions is that the equipment can be relatively expensive. But if Epson America's new Stylus Color 670 inkjet printer is any indication, conventional film processing may finally go the way of the dinosaur.

Despite its budget-friendly estimated price of $89, the 670 produces high-quality photos at resolutions up to 1,440x720 dpi that look at least as good as those from your corner one-hour photo processor. The 670 also adroitly handles your letter and legal-size printing chores, creating documents you'd have a hard time telling apart from those produced with more expensive inkjet printers. (Nevertheless, higher-end photo printers will still buy you even more image detail, better flesh tones, faster print times, and longer-lasting prints.)

Our 7.5x6-inch test photo printed in less than 3 minutes; a full-page 8.5x11-inch print should take less than 5 minutes. Our one-page letter took 40 seconds to print, and the 11-page text document took about 6.5 minutes to print. We measured the text print speed at under 2 pages per minute (ppm), less than half the claimed 5-ppm rate at the printer's default mode. Opting for high-quality mode further reduces the output speed with little visible impact on quality, but a tremendous drain on the ink cartridges.

The printer uses a black cartridge and a three-color cartridge; replacements cost about $24.95 and $29.95 each, respectively. The ink cost might seem high, but the actual per-page consumable costs are rather reasonable: 6 cents per page for monochrome printing and $1.15 for a full-page color photo. (Prices include paper.) The unit comes with both parallel- and USB-port interfaces and works with both PCs and Macs.

This unit should easily satisfy the printing demands of most homes, and it doesn't represent a huge initial investment, nor is it expensive to maintain.   **—Winn L. Rosch**

> At press time, *Computer Shopper* learned that Epson will cease production of the Stylus Color 670 in favor of a new line of color inkjet printers coming out in the October time frame. However, the Stylus Color 670 should be available in the retail channel for a few more months.

★★★★
RATED 1 TO 5 STARS

👍 Inexpensive; low consumable cost; excellent output quality; easy installation

👎 Slow print speeds; printed photos won't last as long as those from more expensive printers

PRODUCT:
Epson Stylus Color 670
COMPANY:
Epson America
Long Beach, CA
800-463-7766, 562-981-3840
www.epson.com
MFR. EST. PRICE: $89

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Playing the Pixel
Numbers Game

DESPITE FUJI PHOTO FILM U.S.A.'S CLAIM THAT ITS $799-estimated FinePix 4700 Zoom digital camera produces 4.3-megapixel images, it makes more sense to think of it as a 2.4-megapixel camera with a superior dynamic range. The FinePix uses Fuji's new Super CCD, which employs 2.4 million octagonally shaped sensors and filters, rather than the traditional rectangular sensors used in the CCDs of most other digital cameras.

In theory, these octagonal sensors create a larger active sensor area with increased light sensitivity. In our tests, the camera yielded bright, saturated images in daylight, and well-exposed indoor shots in low-light situations. For the most part, the FinePix renders cool but accurate color. Under-exposed areas, however, have a tendency to shift to red.

Unfortunately, the FinePix's images don't achieve the level of sharpness we've seen with the best 2-megapixel cameras—in part, because the FinePix doesn't capture uncompressed images. The camera supports three different compression levels, and resolutions of 640x480, 1,280x960, and a scaled-up 2,400x1,800. The resulting images display relatively poor detail resolution and visible artifacts in the shadow areas when viewed at actual size.

The FinePix comes with four AA-size, rechargeable NiMH batteries, a charger, a 16MB SmartMedia card (which holds between 8 and 45 images—depending on the compression level—or up to 80 seconds of video), and a USB cable. The camera has a 35mm-equivalent zoom range of 38mm to 114mm, and its minimum macro-focus distance is 11 inches.

Rather than devoting specific buttons to zoom, flash control, resolution, compression, and playback, the FinePix uses a small circular backlit LCD with buttons for these functions. Less commonly used functions are accessed through the menu system on the primary LCD.

We found the FinePix exceptionally easy to use overall, and a capable, though not outstanding, camera. For what is essentially a 2.4-megapixel camera, however, it is priced considerably higher than the competition.   **—Lori Grunin**

★★★
RATED 1 TO 5 STARS

👍 Easy to use; good dynamic range and color reproduction

👎 No uncompressed output; underexposed areas shift to red; images display poor detail resolution and artifacts in shadow areas

PRODUCT:
Fujifilm FinePix 4700 Zoom
COMPANY:
Fuji Photo Film U.S.A.
Elmsford, NY; 800-800-3854
www.fujifilm.com
MFR. EST. PRICE: $799

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graphics^n

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Tim Briggs
Marketing Manager

As we enter the new millennium, we have an opportunity unlike any experienced before - the exponential growth of the technology industry. Consumers are buying high tech products faster than manufacturers can produce them. And with technology advancing the way it is, the products that were bought just a few years ago generally need to be replaced by faster, better, more versatile products. And so, the demand continues to out-pace the supply.

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We are adding scores of new products every day and our expansion has already been met with tremendous success. Check out our ads here in Computer Shopper to see what's new. Or, for up-to-the-minute listings, check out our website. You'll find a lot of new products available and a LOT more coming. Our commitment to customer service has earned us the title *The Drive Authority* for many years and that same commitment will come with all of these new products. Whether you call on an 800 number, or visit our website, you'll find the same rock solid company here to assist you, now bigger and better than ever before. And so, our new motto - *Everything High Tech - All Under One Roof* will now banner our pages.

We are also growing our infrastructure to handle the increasing business. We have just completed the installation of a massive new phone system in our call center. Both our website and store are now in a huge expansion phase. We are currently handling about 10 million hits per month, and when the new system is finished later this quarter, we'll easily be able to handle several times that volume.

Our secure website at www.MegaHaus.com is second to none with secure online ordering 24 hours a day. The site is simple to use and while you're surfing, check out our technical information area for answers to questions you may have about products you're shopping for. Because of our rapid expansion, bookmark our website and visit us often - you'll won't want to miss our ever-changing specials.

Over the years our continued success has come through:

• **Long-standing Leadership**
Since 1987, we have been building a solid reputation in the industry as a reliable source for computer storage products. Since the early years, we called ourselves *The Drive Authority* and our customers have agreed. Several awards have confirmed that our customers appreciate us and compliment our efforts for them. Our customers become repeat customers and they tell their friends about us.

• **Expertise**
Our staff receives continual training from manufacturers to keep us on the cutting edge of our industry. When you call our sales center or our technical support center, you'll find very knowledgeable people ready to help.

• **Competitive Pricing**
Over the years, we have seen a lot of competitors come and go. It's common to see upstart companies offer deals that are "too good to be true"...and they probably are. Many of our customers have come to us with horror stories of how they bought something at a super low price, only to find that the product wasn't what they thought it was and the company they bought it from was nowhere to be found. We are a strong company which stands by our products and we will be here for many, many years to come. Let me also say this about pricing. Our industry is perhaps the fastest changing industry there is or ever has been. And we might miss a price reduction. So, if you ever see a price that is lower somewhere else, call us. We will do everything we can to earn your business.

• **Availability**
MegaHaus has long, established relationships with our manufacturer and distributor business partners, ensuring that you have the products you want, when you need them. We are also building additional warehouse space to house our increased inventory. Like I said, we're doing business like never before.

• **Reliability**
Our after-the-sale service is award winning. Our customer service staff members are second to none in making our customers happy.

I invite you to call us and check out our website. And if you have any suggestions about new products you'd like to see us carry, send an email to me at timb@megahaus.com. I'd like to hear from you. Happy shopping.

-Tim Briggs, Marketing Manager

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MAXTOR DIAMONDMAX 60 | HARDWARE

Hard Driving a
Great Bargain

Best Buy
October 2000

APPARENTLY, IT ONLY TOOK ONE FIVE-millionth of an inch to create one of the best buys in hard drive storage. By reducing the height at which the read/write head moves above the platters of the DiamondMax 60 by this minuscule amount, Maxtor has increased storage capacity 50 percent over the drive's predecessor. With an incredible estimated price of $329, this new 60GB hard drive easily represents the lowest cost per gigabyte of any drive we've seen.

The key to this low price is the drive's modest 5,400-rpm spindle speed. The slow rotations enable the data to be packed tighter onto the drive's four aluminum platters. As a result, the drive yields the highest density of current mass-market drives—15.3GB per platter—for a total of 61,444,227,072 bytes.

Maxtor claims that the Diamond-Max 60's performance should be comparable to that of a true 7,200-rpm drive, and our testing confirms this.

Despite spinning 25 percent slower than Maxtor's speedy DiamondMax Plus 40 (a 7,200-rpm drive), the DiamondMax 60 lagged only about 11 percent behind it on our Business Disk WinMark 99 test and was approximately 8 percent slower on the High-End Disk WinMark 99. This means that while it may not be the fastest drive we've seen, the DiamondMax 60 should be more than fast enough for most mainstream applications.

As with all large-capacity drives, the DiamondMax 60 can be problematic in older PCs. Maxtor's MaxBlast installation utility includes a software BIOS that makes the drive's full capacity available in aging systems. During setup, MaxBlast reported the wrong partition size, but it successfully created a correctly sized partition and made an exact copy of an existing boot drive. More experienced users can set up the DiamondMax 60 using Windows' FDISK utility, because the drive's capacity is just shy of FDISK's 64GB rollover limit.

Its low price and easy installation make the DiamondMax 60 an excellent, quick upgrade if you need to drastically expand your storage capacity. Indeed, you'd be hard-pressed to buy your gigs for less. —**Winn L. Rosch**

★★★★
RATED 1 TO 5 STARS
👍 Excellent value; tons of storage capacity
👎 Performance not as good as the competition's

PRODUCT:
Maxtor DiamondMax 60
COMPANY:
Maxtor Corp.
Milpitas, CA
800-262-9867, 408-432-1700
www.maxtor.com
MFR. EST. PRICE: $329

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BOSTON ACOUSTICS BA4800

Hearing Is as
Good as Believing

MOVIEGOERS HAVE COME TO EXPECT THE SOUNDS of planes, trains, and automobiles whooshing by from one side of the theater to the other. But hearing this same realistic 3D positional audio while playing games or while watching DVD movies on your home computer is something most of us have never experienced. Boston Acoustics hopes to change all that with its $199.95-estimated BA4800 five-speaker audio system.

To enjoy the full capabilities of the BA4800, you'll need a four-channel sound card. We tested this powerhouse of a speaker system with an Aureal Vortex2 SQ2500 and were pleased to find the speakers emitting distortion-free, superb-sounding audio, even with the volume cranked all the way up. The BA4800 will also deliver two-channel sound, but why bother?

The two front satellites rest on small tripod stands on your desktop; the two rear satellites come with 16-inch-high floor stands. The stands are sturdy, but in cramped quarters it would be nice to have the option of mounting the speakers on a wall. Additionally, the large subwoofer assembly, with a 6.5-inch cone, could easily cramp the available leg space beneath your desk, especially if you already store your PC's tower case there.

Setup is simple, thanks to the color-coded cables and plain-English instructions. The speakers also come supplied with generous lengths of cable—a small, but important, consideration when trying to find the best positioning. The controls are conveniently located on the front of the right satellite speaker. One knob controls the power and overall volume, another balances the level of the surround-sound effects coming out of the rear speakers, and the third adjusts the subwoofer's volume. The system doesn't include a headphone jack or a remote-control puck.

For those seeking to add high-quality surround sound to games or DVD movies, the BA4800 is an excellent choice. Hearing bullets whiz by or planes flying overhead is a surefire way to be drawn into the experience and to shut out intruding reality.

—**Richard and Andrea Stapleton**

★★★★
RATED 1 TO 5 STARS
👍 Realistic surround sound; impressive audio quality
👎 No headphone jack, wall mounts, or remote control

PRODUCT:
Boston Acoustics BA4800
COMPANY:
Boston Acoustics
Peabody, MA; 978-538-5136
www.bostonacoustics.com
MFR. EST. PRICE: $199.95

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NETWORKS

Phone Home for Free by PC

MOST COMPUTER USERS WHO HAVE TRIED Internet-based phone calls can attest to the spotty sound quality and annoying echoes. However, the underlying technologies have recently undergone some improvements and a number of vendors are now coming out with hardware solutions that not only sound much better, but let you place free local and long-distance calls over the Internet. Actiontec's USB InternetPhoneWizard is one such product, and its $99.95-estimated cost could be the last you'll ever spend on phone calls.

The InternetPhoneWizard connects to your PC over a USB port. It can use any of five Internet telephony service providers (ITSPs) to route your calls over the Internet to phones on the regular phone network. Calls within the United States and Canada are free, and international calls cost as little as 8 cents per minute. (Some ITSPs now even offer free international

long distance to select countries.) Whether you have a standard modem connection or a broadband connection, you can call any person with a working phone, even if he or she doesn't have a computer.

The InternetPhoneWizard goes between your telephone and the phone line. Your phone continues to work normally over the regular telephone circuit until you activate the InternetPhoneWizard by pressing the telephone's pound key twice. Assuming your computer is logged into the Internet, you'll then hear a special, low-pitched dial tone, indicating that your Internet connection is ready. Just dial the phone number you want and your call goes through like a normal call.

Sound quality is equivalent to that of the average long-distance connection. It's not the crystal-clear, you-can-hear-a-pin-drop quality you get from a good fiber-optic connection, but it's far from the distorted, echoing sound you may have experienced with previous Internet phone connections.

Setting up and using the InternetPhoneWizard is practically a no-brainer, so even the PC neophyte can benefit from its potential cost savings. With an up-front investment of less than $100, the InternetPhoneWizard could pay for itself in no time. —*Bill Dyszel*

★★★★
RATED 1 TO 5 STARS

👍 Economical way to make phone calls; easy to use
👎 Some service providers can't connect you if you're behind a firewall.

PRODUCT: Actiontec USB InternetPhoneWizard
COMPANY: Actiontec Electronics
Sunnyvale, CA
800-797-7001, 408-752-7700
www.actiontec.com
DIRECT PRICE: $99.95

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Home Networking Made Easy

IF YOU'RE AMONG THE FOLKS WHO JUMPED ON THE broadband bandwagon, and have more than one PC in your home, you stand to benefit from networking your systems together. Your home can share a single fast connection to the Web—and you can even save a few bucks in the process. Intel's $99-estimated (per unit) AnyPoint Phoneline Home Network 10 Mbps USB device is one of the first external HomePNA 2.0-based phone-line networking kits to come along. For users who don't like to open up their systems or who have already filled their systems to capacity with add-in cards, the AnyPoint is the perfect solution.

Setting up the AnyPoint takes only a few minutes. Plug the device into your system's USB port, connect a standard phone cord between the adapter and the phone jack in your wall, and install the software. Of course, you'll need a unit for each PC in your home that you wish to network. In addition to sharing an Internet connection, the AnyPoint lets you

share files and printers across all your networked systems.

The AnyPoint comes with Intel's Internet Sharing Software (ISS). In addition to being easy to configure, ISS makes sharing an Internet connection as simple as can be—even if you use a dial-up modem connection. With ISS, you can dial into the Internet from any PC on the network, as long as the primary PC (the "server") is powered on.

Although the AnyPoint is rated at 10Mbps, Intel acknowledges that the device's practical bandwidth is much closer to 4.5Mbps. In our testing, we experienced a sustained data-transfer rate that ranged from 3.5Mbps to 4Mbps. We saw the slower 3.5Mbps transfer rate only while transferring files between systems and simultaneously downloading data through a dial-up Internet connection.

Despite this negligible shortcoming, the AnyPoint's easy installation and competitive price make it an excellent choice if you're looking for a simple way to network your PCs at home.

—*Neil Randall*

★★★★
RATED 1 TO 5 STARS

👍 Easy to install; no need to open up your system
👎 Data transfers slower than 10Mbps
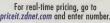
PRODUCT: Intel AnyPoint Phoneline Home Network 10 Mbps USB Model
COMPANY: Intel Corp.
Santa Clara, CA
877-649-5817, 408-765-8080
www.intel.com/anypoint
MFR. EST PRICE: $99

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intel inside celeron PROCESSOR

intel inside pentium III

8293

Common Features

- > 102-key Keyboard with Numeric Keypad
- > 256KB On-Die L2 Cache
- > 2X AGP 8MB ATI Rage Pro 3D Video
- > Removable 6.0GB, 10.0GB, or 20.0GB Hard Drive opt.
- > Removable 3.5" 1.44MB FDD exchangeable with opt. LS-120, Iomega Zip Drive, or 2nd HDD
- > 3D Surround Sound with Hardware Wavetable
- > 2 Built-In Stereo Speakers and 1 Built-In Microphone
- > Built-In Touchpad Pointing Device
- > 2 Type II or 1 Type III PCMCIA Slots which support ZV-Port and Card Bus
- > PCMCIA 56K Capable[3] V90 Modem
- > 75.6w Smart Lithium-Ion Battery
- > Infra Red, Wireless Fast IR Interface
- > 1 IEEE 1394 Port & 1 Video-In Port
- > 2 USB Ports & 1 TV-Out Port
- > Other Ports: 1S, 1P, Ext. Keyboard and Ext. CRT
- > Jacks: 1 Line-In, 1 Line-Out and 1 Microphone
- > Microsoft® Windows® 98
- > Carrying Case and AC Adapter

15.1" XGA Active Matrix Display
Mobile Pentium® III Processor 700MHz
  Featuring Intel® SpeedStep™ Technology
128MB 100MHz SDRAM expandable to 512MB
Removable 20.0GB Hard Drive[4]
8X[1] Max. DVD-ROM Drive **$2595**

15.1" XGA Active Matrix Display
Mobile Pentium® III Processor 750MHz
  Featuring Intel® SpeedStep™ Technology
256MB 100MHz SDRAM expandable to 512MB
Removable 20.0GB Hard Drive[4]
8X[1] Max. DVD-ROM Drive **$2895**

2893

Common Features

- > 256KB On-Die L2 Cache
- > 2X AGP 8MB ATI Rage Pro 3D Video
- > Removable 6.0GB, 10.0GB, or 20.0GB Hard Drive opt.
- > 3.5" 1.44MB Floppy Disk Drive
- > 3D Surround Sound
- > 2 Built-In Stereo Speakers and 1 Built-In Microphone
- > Built-In Touchpad Pointing Device
- > 1 Type II PCMCIA Slot which supports ZV-Port and Card Bus
- > 10/100 Ethernet Lan Adapter
- > 56K Capable[3] V90 Modem
- > Smart Lithium-Ion Battery
- > Infra Red, Wireless Fast IR Interface
- > 2 USB Ports
- > Other Ports: 1S, 1P, Ext. Keyboard and Ext. CRT
- > Jacks: 1 Line-In, 1 Line-Out and 1 Microphone
- > Microsoft® Windows® 98
- > Slim Notebook: 12.8"w x 10.15"d x 1.49"h

15.1" XGA Active Matrix Display
Mobile Pentium® III Processor 600MHz
  Featuring Intel® SpeedStep™ Technology
64MB 100MHz SDRAM expandable to 512MB
Removable 10.0GB Hard Drive[4]
24X[2] Max. CD-ROM Drive (8X[1] Max. DVD opt.) **$2095**

15.1" XGA Active Matrix Display
Mobile Pentium® III Processor 700MHz
  Featuring Intel® Speed Step™ Technology
128MB 100MHz SDRAM expandable to 512MB
Removable 10.0GB Hard Drive[4]
8X[1] Max. DVD-ROM Drive **$2395**

3593

Common Features

- > 256KB On-Die L2 Cache
- > 2X AGP 8MB ATI Rage Pro 3D Video
- > Removable 6.0GB, 10.0GB, or 20.0GB Hard Drive opt.
- > Removable 3.5" 1.44MB FDD exchangeable with opt. LS-120 or 2nd HDD
- > 3D Surround Sound with Hardware Wavetable
- > 2 Built-In Stereo Speakers and 1 Built-In Microphone
- > Built-In Touchpad Pointing Device
- > 2 Type II or 1 Type III PCMCIA Slots which support ZV-Port and Card Bus
- > 56K Capable[3] V90 Modem
- > Smart Lithium-Ion Battery
- > Infra Red, Wireless Fast IR Interface
- > 1 IEEE 1394 Port
- > 2 USB Ports & 1 TV-Out Port
- > Other Ports: 1S, 1P, Ext. Keyboard and Ext. CRT
- > Jacks: 1 Line-In, 1 Line-Out and 1 Microphone
- > Microsoft® Windows® 98
- > Carrying Case and AC Adapter
- > Slim Notebook: 12.4"w x 10.1"d x 1.4"h

14.1" XGA Active Matrix Display
Mobile Pentium® III Processor 700MHz
  Featuring Intel® Speed Step™ Technology
128MB 100MHz SDRAM expandable to 512MB
Removable 10.0GB Hard Drive[4]
8X[1] Max. DVD-ROM Drive **$2195**

14.1" XGA Active Matrix Display
Mobile Pentium® III Processor 750MHz
  Featuring Intel® Speed Step™ Technology
128MB 100MHz SDRAM expandable to 512MB
Removable 20.0GB Hard Drive[4]
8X[1] Max. DVD-ROM Drive **$2445**

3593

Common Features

- > 128KB On-Die L2 Cache (Intel® Celeron™ Processor)
- > 256KB On-Die L2 Cache (Intel® Pentium® III Processor)
- > 2X AGP 8MB ATI Rage Pro 3D Video
- > Removable 6.0GB, 10.0GB, or 20.0GB Hard Drive opt.
- > Removable 3.5" 1.44MB FDD exchangeable with opt. LS-120 or 2nd HDD
- > 3D Surround Sound with Hardware Wavetable
- > 2 Built-In Stereo Speakers and 1 Built-In Microphone
- > Built-In Touchpad Pointing Device
- > 2 Type II or 1 Type III PCMCIA Slots which support ZV-Port and Card Bus
- > 56K Capable[3] V90 Modem
- > Smart Lithium-Ion Battery
- > Infra Red, Wireless Fast IR Interface
- > 1 IEEE 1394 Port
- > 2 USB Ports & 1 TV-Out Port
- > Other Ports: 1S, 1P, Ext. Keyboard and Ext. CRT
- > Jacks: 1 Line-In, 1 Line-Out and 1 Microphone
- > Microsoft® Windows® 98
- > Carrying Case and AC Adapter
- > Slim Notebook: 12.4"w x 10.1"d x 1.4"h

14.1" XGA Active Matrix Display
Intel® Celeron™ Processor 600MHz
64MB 100MHz SDRAM expandable to 512MB
Removable 6.0GB Hard Drive[4]
24X[2] Max. CD-ROM Drive (8X[1] Max. DVD opt.) **$1745**

14.1" XGA Active Matrix Display
Mobile Pentium® III Processor 600MHz
  Featuring Intel® Speed Step™ Technology
64MB 100MHz SDRAM expandable to 512MB
Removable 10.0GB Hard Drive[4]
24X[2] Max. CD-ROM Drive (8X[1] Max. DVD opt.) **$1945**

MOBILE

NEC VERSA SXI

Have It Your Way
With This Hot-Swapper

TIRED OF MAKING COMPROMISES WHEN IT COMES TO NOTEBOOKS? NEC Computers is determined to meet as many needs as possible with its Versa SXi. The unit delivers top performance with maximum flexibility, thanks to a hot-swappable bay that supports six different storage modules. Furthermore, NEC has kept the weight of the core unit under 6 pounds. Although the battery life could use some improvement, most power users should be happy with this full-featured system.
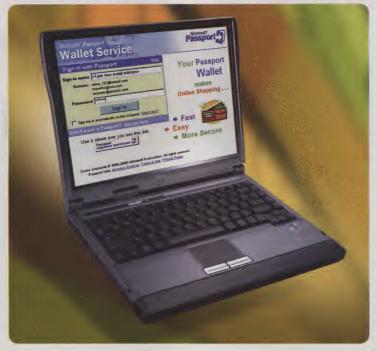
At $3,399, the Versa SXi is definitely a premium-priced unit, and as such it comes with a high-performance configuration, including a 700MHz Pentium III processor, 128MB of SDRAM, a 12GB hard drive, a 3D-capable graphics chip with 8MB of VRAM, and a 6x DVD-ROM drive. The one trade-off NEC made was the screen, which is 14.1 inches instead of the 15-inch size that is becoming standard for units in this class. NEC says the smaller screen size was necessary to maintain a lower weight—5.9 pounds without accessories, or 6.4 pounds with the AC adapter and a spare component for the modular bay. At 1.4x12.1x10 inches (HWD), the unit is quite sleek as well.

The Versa SXi's truly outstanding feature is the hot-swappable VersaBay III, an exceptionally useful feature for mobile professionals who need a lot of choices while on the road. The standard configuration (which sells for $3,199) includes both floppy and CD-ROM drives, but you can also choose among LS-120, CD-RW, DVD-ROM, and hard drives. The overall system price will vary depending on what drive you choose. Our $3,399 test system came with a floppy drive and a DVD player, instead of the CD-ROM drive. You can purchase additional drives separately. Prices range from $199 for an LS-120 to a steep $695 for an 18GB hard drive. The bay let us swap the floppy and DVD-ROM drives on the fly without a hitch.

The IT department back at the home office will also appreciate that all the com-

ponents, as well as the AC adapter, can be used across the entire NEC notebook line. This flexible approach extends to connectivity options, where NEC hasn't missed a trick. In addition to the standard items (integrated modem, USB port, one Type III or two Type II PC Card slots, serial port, parallel port, VGA port, and PS/2 port), the notebook also supports dual video display—just the ticket for presentation pros.

From a performance standpoint, the SXi also delivers everything you'll ever need on the road. According to the unit's Business Winstone 99 scores, the SXi has more than enough horsepower for

business-minded applications in SpeedStep, performance, or battery-optimized mode. (The SXi's processor speed in performance mode is 700MHz, and in battery-optimized mode it is 550MHz.) In performance mode, the SXi's Winstone score of 26.7 is among the highest we've seen from notebooks thus far.

Its BatteryMark 3.0 time, on the other hand, was merely average. In performance mode, the SXi lasted 2 hours and 56 minutes, which is about average for a high-end unit. In battery-optimized mode, the unit's result of 3 hours and 15 minutes was a bit better but still close to average.

Other drawbacks included stereo speakers that were barely audible even at the highest settings. When we used a pair of headphones, however, the unit sounded fine. In addition, the actuation buttons for the touch pad had a strangely flat feel, as if the springs were not under the buttons. Alternately, users can also double-tap on the touch pad.
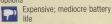
Fortunately, the keyboard did not suffer from similar problems; we found it comfortable to use, with responsive travel. The unit comes with 87 keys, including dedicated arrow, page-up, and page-down keys.

NEC offers an above-average parts-and-labor warranty, covering the unit for three years. An added bonus is the one year of Global UltraCare Preferred Service, which includes door-to-door courier pickup and return of a damaged notebook. NEC says that repairs are usually made within one business day for common hardware problems. With its wide range of options and blazing-hot performance, the NEC Versa SXi should be just right for many mobile power users.

—*Richard S. Shim*

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Intel® Pentium® III processor

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DVD
14.1" XGA

intel inside
pentium® III

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Features	Toshiba Tecra 8100	Dell Latitude CPx	IBM Thinkpad A20m	WinBook Si
Processor Speed	Intel® Pentium® III processor			
	750 MHz	750 MHz	700 MHz	800 MHz
Display	14.1" TFT	14.1" TFT	14.1" TFT	14.1" XGA
Graphics	2x AGP	2x AGP	2x AGP	2x AGP
RAM	64 MB	64 MB	64 MB	64 MB
Hard Drive	6 GB	6 GB	12 GB	6 GB
DVD-ROM	6X	6X	6X	6X
Modem	56k/v.90	56k/v.90	56k/v.90	56k/v.90
3.5" Drive	Yes	Yes	Yes	Yes
Free Internet	No	No	No	Yes
Price	$3499	$3297	$2848	$1999

Configurations and prices are based on a web audit 7/26/00. All models using Windows® 98 Second Edition operating system. Configuration details may differ.

†56k modems are capable of 56 kps downloads. Due to FCC rules that restrict power output, however, current download speeds are limited to 53 kps. Upload speeds are limited to 33.6 kps. Actual speeds may vary depending on line conditions. Prices and specifications valid in U.S. only and subject to change without notice. All purchases are subject to availability. For a complete copy of Guarantees and Limited Warranties, contact WinBook Computer Corporation or our website at www.winbook.com/warranty.html. ®2000 WinBook Computer Corporation and My Favorite PC.com. All rights reserved. WinBook is a registered trademark of Micro Electronics, Inc. All rights reserved. Intel, the Intel Inside logo and Pentium are registered trademarks of Intel Corporation.

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Gateway recommends Microsoft® Windows® 2000 Professional for business.

MOBILE

DELL INSPIRON 5000E

Star of the Big Screen

Best Buy
October 2000

CINEMA BUFFS, YOUR IDEAL NOTEBOOK HAS ARRIVED. WITH A stunning 15-inch screen and some of the best performance scores we've ever seen in a portable, the Dell Inspiron 5000e is perfect for watching DVDs, gaming, or—when work beckons—giving presentations. It's an ideal desktop-replacement system, but as a travel companion, its substantial price and weight make it best suited for mini-moguls with cash to burn and interns to carry their luggage.

Priced at $3,459, the Inspiron 5000e is equipped with Intel's superfast 750MHz Mobile Pentium III processor. The CPU includes Intel's SpeedStep technology, which powers the system down to 600MHz when running off the battery (although it can be set back at 750MHz manually). The added firepower really makes a difference. Most of our benchmarks exceeded expectations, especially the Business Winstone 99 score of 27.1 in full-performance mode, which surpassed other everything-but-the-printer laptops costing hundreds of dollars more.

This racecar engine is paired with almost everything you'd expect from a luxury ride: a whopping 30GB of storage, 128MB of SDRAM on two DIMMs, a V.90 modem, and an 8x DVD-ROM drive. You'll also find two USB ports, an S-Video output (TV out), IrDA, and two PC Card slots. The usual parallel and serial connections and a VGA output are all there as well. The omission of an IEEE 1394 (FireWire) port was puzzling, considering the rest of this power-packed configuration.

While the integrated floppy drive is fixed, you can swap several options in the Media Bay, including the DVD-ROM drive and second battery bundled with our test configuration. The Media Bay will also accommodate options such as a Zip drive (available direct from Dell for $139) or CD-RW drive (for $289). If you opt for a CD-ROM rather than a DVD-ROM drive, you can save $130.

All of the Inspiron's outstanding features take a backseat to the stunning 15-inch display, which is truly a showstopper. With a phenomenal 1,400x1,050-pixel resolution, shadows and subtle shades of color are crystal-clear, making the system ideal for gaming, watching DVD movies, or giving presentations. (Note that if you use the VGA port to connect to an external monitor, you'll only get a maximum resolution of 1,280x1,024.)

At a resolution of 1,400x1,050, this screen can easily display images taken with a 1- or 1.3-megapixel digital camera. And while onscreen fonts do appear rather small, if you use large spreadsheets you'll be amazed at how many cells you can display.

In fact, with 117 pixels per inch, the screen is so sharp that those sitting around you on your next flight will easily be able to see what you're working on. Of course, you'll have to be flying in first class, because that's the only place you'll be able to open this 12.9x10.5-inch giant, which weighs in at a not-insubstantial 7.54 pounds.

Fortunately, the Inspiron 5000e is also a monster when it comes to opening multiple programs and juggling spreadsheets, as noted by its top performance numbers. Video playback was smooth from the DVD-ROM drive, and the built-in stereo speakers were better than average. The 16MB ATI Rage Mobility 128 accelerator will keep business users happy, although it won't beat out high-end desktop gaming systems. The only benchmark test result that wasn't outstanding was battery life. Its BatteryMark 3.0 runtime of 2 hours and 57 minutes in battery-optimized mode—and 2 hours and 48 minutes in maximum performance mode—was acceptable but mediocre for this notebook's class.

One ergonomic detail that's worth mentioning: As with other large-screen notebooks, the top half of the Inspiron is so big that when closed it actually extends slightly beyond the edge of the bottom half. You have to be careful not to catch the edge when you're carrying it.

Nevertheless, the 5000e is a tough package to beat. Dell includes Microsoft Office 2000 Small Business with the unit, and throws in a three-year onsite warranty (with service usually provided the next day). Combine this with round-the-clock toll-free tech support and the system's brilliant screen, and the Inspiron 5000e is worth its substantial price—especially when compared with other, even pricier systems. Just make sure your budget and biceps can handle it.

—John R. Quain

★★★★
RATED 1 TO 5 STARS

👍 Big, sharp screen; excellent performance
👎 No IEEE 1394 port; mediocre battery life

SYSTEM:
Dell Inspiron 5000e
COMPANY:
Dell Computer Corp.
Round Rock, TX; 800-917-3355
www.dell.com
AS TESTED: 750MHz Pentium III; 128MB SDRAM; 30GB hard drive; 8x DVD-ROM drive; 15-inch SXGA+ active-matrix display; internal 3.5-inch floppy drive; 16MB ATI Rage Mobility 128 graphics chip; ESS Maestro sound card; V.90 modem; lithium-ion battery; Windows 98 Second Edition; Microsoft Office 2000 Small Business
DIRECT PRICE: $3,459

ZDNet Price It!™
3 3 8 6 1
For real-time pricing, go to *priceit.zdnet.com* and enter number.

MULTI-TALENTED

The Fujitsu LifeBook™ C Series delivers high performance utilizing a Mobile Pentium® III processor featuring Intel® SpeedStep™ Technology. This advanced multimedia machine includes a large 14.1" XGA TFT display, built-in modem, built-in DVD, wireless IR mouse*, and the amazing LifeBook CoolView status panel.

intel inside®
pentium®*III*

FUJITSU

THE POSSIBILITIES ARE INFINITE

What would you call a feature-rich notebook that excels in both multimedia and performance? We call it our LifeBook C Series. A beautifully engineered notebook that acts like a desktop; this is the ultimate multimedia machine. With its LifeBook CoolView status panel, wireless IR mouse* and personal CD player this superstar provides advanced Yamaha® audio and ATI® video features you want.

Includes Windows® 98 Second Edition – the home version of the world's favorite software.

For a complete line of Fujitsu mobile products, please visit us at
www.fujitsupc.com
or call us at 1-877-FPCDirect.

MOBILE

ACER TRAVELMATE 524TXV

A Desk-Worthy Roadster

GETTING A TRUE DESKTOP REPLACEMENT IN A NOTEBOOK USED TO be a real challenge. A fully stacked machine was likely to bust either your back or your budget. Today, however, models such as Acer America Corp.'s TravelMate 524TXV are clearing off desks everywhere. Although performance could be better, this unit packs a competitive array of hardware into a frame that weighs less than 7 pounds and costs a reasonable $2,399.

Fitting on an airplane tray table is a bit of a squeeze for the TravelMate, as it measures a rather bulky 1.4x12.2x10 inches (HWD). But if you can make the room, you'll appreciate the computing power the TravelMate puts at your disposal.

With its 14.1-inch TFT screen, three-spindle design, 650MHz Pentium III processor, 64MB of SDRAM, and 12.1GB hard drive, the TravelMate certainly doesn't leave anything out. If you don't need DVD, you can save a few dollars by opting for a 24x CD-ROM drive. If you yearn to burn, you can swap in an optional CD-RW drive. The one minor drawback here is that you can't substitute a second battery for either of the drives—a feature that would save you from having to stop work to swap batteries on long flights.

Fortunately, the TravelMate gets good mileage on its single lithium-ion cell. In our demanding BatteryMark test, the system lasted more than 3.5 hours—even without the processor's SpeedStep feature enabled, which saves power by switching to a lower speed. As for the rest of the notebook's test scores, they were surprisingly low across the board, with a CPUmark 99 of 41.3 and a Business Winstone 99 score of 19.6. By comparison, our 500MHz Pentium III benchmark system achieved a CPUmark of 47.2 and a Winstone score of 22.8. The TravelMate is plenty fast, but it should be faster.

A strong video subsystem helps make up for some of this sluggishness. The ATI Rage Mobility-M1 graphics accelerator fea-tures 8MB of video memory, somewhat rare for a notebook. (Many have 4MB or less.) For everything from video editing to games, the TravelMate has power to spare. We loaded up Quake III and found that it looked excellent on the gorgeous screen and ran at very playable frame rates.

The screen also provides a great show-case for movies on DVD. The TravelMate's 6x drive proved more than up to the task, delivering smooth playback with nary a hic-cup, so long as no other programs were running. As for the audio, like many note-books, it lacked bass, but proved loud and clear enough for movies and music. Because the speakers are mounted below the screen rather than near the keyboard, they project outward instead of upward—a definite plus.

Like any desktop replacement worth its salt, the TravelMate has a built-in V.90 modem and a 10/100Mbps Fast Ethernet adapter. Equally welcome are the system's two USB ports, double the number found on many notebooks. The rest of the Travel-Mate's expansion options are the usual fare: two Type II PC Card slots, three audio jacks, a parallel port, a serial port, an infrared transceiver, and more.

Acer earns kudos for equipping the TravelMate with two conve-nience-minded features: the note-book's quartet of programmable quick-launch buttons, which ease everything from jumping to a spe-cific Web site to loading your word processor, and a scroll key designed for push-button scrolling in long documents and on Web sites. The scroll key, mounted below the two touch-pad buttons, is a feature no notebook should be without, as it saves a lot of tedious pointing and clicking.

Acer bundles a smart mix of software, including Microsoft Works 2000 (a versatile and novice-friendly applications suite), PC-Doctor, PC-cillin 98, and TimeMachine, a utility that allows users to recover lost or damaged files, or revert the system to an earlier state of operation.

The TravelMate's warranty is on the short side, at one year. Fortunately, you can add up to two additional years for $99 per year. Acer's toll-free technical support is available around the clock.

Boasting enough features to make a desktop PC jealous and a travel-friendly battery life, the Acer TravelMate 524TXV is a smartly designed notebook suitable for the office or the frequent-flyer lounge.

—*Rick Broida*

The only Ultra-Mobile with a built-in flexible bay. The Fujitsu LifeBook™ S Series is powered by a Mobile Pentium® III processor featuring Intel® SpeedStep™ Technology. This notebook weighs in under 4 lbs, has a 12.1" XGA TFT display, modular DVD or CD, a built-in modem and Ethernet for communication solutions when you need it.

ULTRA UNIQUE

How unique can any notebook really be? Well, ours weighs-in at under 4 pounds which makes it ultra-light. And it has a flexible bay built right in which makes it ultra-mobile (the only one of it's kind). So since you have the option of what device you use (like a DVD), this LifeBook S Series notebook makes your life on the road ultra-convenient. Pretty Smart! Pretty Small! Pretty Unique!

Fujitsu recommends Windows® 2000 Professional for business.
For a complete line of Fujitsu mobile products, please visit us at
www.fujitsupc.com
or call us at 1-877-FPCDirect.

FUJITSU
THE POSSIBILITIES ARE INFINITE

KODAK PALMPIX CAMERA

Add Snap to Your Palm

EVER THOUGHT YOUR PALM COULD MAKE PEOPLE say cheese? Your PDA could be getting smiles in no time with Eastman Kodak Co.'s $179 Kodak PalmPix Camera, a clip-on unit that turns most Palm handhelds into a digital camera. Although the 24-bit color images can be a bit fuzzy, this highly pocketable device is a handy way for Palm users to take photos on the go.

The PalmPix is both small and simple, packing a lens and a battery compartment for two AAAs into a unit that's tinier than a pack of cigarettes and about as light. It snaps onto the bottom of any Palm III or Palm VII series handheld. (A $35 adapter provides compatibility with the Palm V series.) Once you've installed the PalmPix applet on your Palm, you're ready to shoot. The handheld's screen serves as the viewfinder, and its memory stores the pictures.

The camera offers two resolutions: 320x240 or 640x480. In high-resolution mode, the press of a Palm button also activates a 2x digital zoom. Each high-resolution photo consumes about 100K, so if your Palm has only 2MB of RAM, you'll feel the memory crunch after just a few snaps. Fortunately, the PalmPix software tells you how many pictures you can take, based on resolution and the amount of available memory.

The software lets you select which photos to transfer to your PC when you synchronize, and you can choose BMP or JPEG format. Kodak supplies NewSoft's Presto Mr. Photo for editing, e-mailing, and printing pictures.

In our tests, the PalmPix produced fairly clear and colorful pictures at 640x480, but the lower resolution was too blurry to be useful. The camera lacks a flash, and the Palm's low-resolution gray-scale screen makes a terrible viewfinder. (Even the Palm IIIc's color screen displays previews in gray scale.) Accurately framing a shot is challenging at best, and virtually impossible in dimly lit areas. The unit is also a bit expensive; stand-alone cameras with this level of resolution often sell for under $100.

Nevertheless, the Kodak PalmPix Camera delivers images that are more than sufficient for e-mailing to friends, and its small size makes it more than handy. If you're a photo-minded Palm user, you'd do well to consider this clever accessory. —**Rick Broida**

★ ★ ★
RATED 1 TO 5 STARS
👍 Compact and lightweight; works with virtually all Palm models
👎 Palm's low-resolution screen makes it hard to see what you're shooting

PRODUCT:
Kodak PalmPix Camera
COMPANY:
Eastman Kodak Co.
Rochester, NY
800-235-6325, 716-724-4000
www.kodak.com
LIST PRICE: $179

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BOXLIGHT XD-9M

Small and Light, But Oh, So Bright

PORTABLE MULTIMEDIA PROJECTORS USED TO sacrifice brightness and resolution for light weight. But while your ache-free back might have led to better presentations, the visuals were best for just a few folks sitting around a small table. Today's crop of ultralight projectors, however, raises the image-quality bar without swelling weight above 5 pounds. The Boxlight XD-9m, weighing a mere 4.8 pounds, is a good case in point. And while it's not a bargain at $5,499, it costs $500 less than the very similar InFocus LP335, which features the same plastics and base specifications.

The XD-9m is rated to deliver a whopping 1,000 lumens of brightness thanks to a 120-watt mercury arc lamp and single DLP chip. It features a maximum 1,024x768 XGA native resolution but handled the 800x600 image from our test notebook without significant pixelation.

The image was definitely bright enough for any large conference room, even with room lights on. The picture was smooth and rich, with consistent brightness from corner to corner. Unfortunately, audio quality was particularly tinny, due to the unit's small size and its tiny 1-watt monaural speaker. You're better off just running the sound from your notebook or schlepping along some multimedia speakers if you need real audio oomph.

USB has made remote-mouse-control setup on today's projectors pretty painless. The XD-9m ships with a single cable that includes both the monitor-out and USB connections in one, and both are virtually plug-and-play. We simply rebooted our notebook to activate the remote-mouse capability.

The remote itself is very standard and rather limited, featuring a trigger left-mouse click, a membrane-style cursor control, and five dedicated buttons for important features. Cursor control was accurate, if a little stiff, but we'd like to have seen dedicated volume buttons and a laser pointer in a unit at this price. Otherwise, remote-controlling the XD-9m was a cinch.

The Boxlight XD-9m proves that ultraportable projectors are finally getting powerful enough to compete with their heavier, more feature-rich brethren, at least when it comes to image quality and brightness. Backed with a two-year parts-and-labor warranty, the unit is an excellent choice for presenters on the go. —**Asa Somers**

★ ★ ★ ★
RATED 1 TO 5 STARS
👍 Extremely lightweight; bright, clear images; easy setup
👎 Poor sound; limited remote-control functions

PRODUCT: Boxlight XD-9m
COMPANY: Boxlight
Poulsbo, WA
800-762-5757, 360-779-7901
www.boxlight.com
MFR. EST. PRICE: $5,499

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priceit.zdnet.com and enter number.

MOBILE

RIM 957 WIRELESS HANDHELD

Pack Your E-Mail
For the Road

I N TODAY'S REAL-TIME ECONOMY, CHECKING E-MAIL AT home and at work is beyond insufficient. Every professional who has lost all understanding of work-life balance knows that wireless e-mail access is a must. Fortunately for these overachievers, Research In Motion (RIM) has introduced the RIM 957 Wireless Handheld, a mobile messaging machine that's destined to be their constant companion. It's not cheap at $499, though.

RIM achieved success with its BlackBerry two-way pager, which caused finger strain for countless go-getters due to its minuscule screen and keyboard. The RIM 957 looks like a cross between those earlier models and a PDA, and at 0.7x3.1x4.6 inches and 5.3 ounces, it's around the same size as a Palm V. The unit is based on a 32-bit 386 Intel processor with 5MB of RAM and is powered by a lithium-ion battery. New messages are announced by either a vibrating or audio alert.

A larger size makes the RIM 957 a lot more comfortable when it comes to reading and writing e-mail. The 19-line backlit display made the biggest difference, but because the keyboard has only 31 keys, we still spent much time searching for secondary key functions such as numbers and symbols. Fortunately, the device allows users to program canned responses, and navigating the menu was intuitive and easy with the scroll button.

The RIM 957 can also manage your personal information thanks to synchronization with popular programs such as Microsoft Outlook and Schedule+, Lotus Organizer, Act, and GoldMine. The unit can also synchronize with your e-mail inbox if you use Microsoft Exchange; Lotus Notes support is expected by the end of the year. We found synchronization using the included docking cradle to be relatively speedy, and experienced no hiccups or pauses while putting the unit through its paces.

Service via BellSouth's nationwide Mobitex wireless data network costs $39.95 per month for unlimited use, which is certainly competitive. We found the coverage to be good even indoors. Although the hardware is expensive, people who absolutely, positively must be reachable everywhere will find this device indispensable. —**Richard S. Shim**

★★★
RATED 1 TO 5 STARS
👍 Instant on; unlimited e-mail access; solid features
👎 Expensive; tiny keyboard

PRODUCT:
RIM 957 Wireless Handheld
COMPANY:
Research In Motion
Waterloo, ON, Canada
877-255-2377, 519-888-7465
www.rim.net
MFR. EST. PRICE: $499
for device; $39.95 per month for service

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CREATIVE NOMAD II MG

A Portable
Sound Studio

Best Buy October 2000

JUDGING BY THE NOMAD II MG, IT'S TRUE that the best (and most expensive) things come in small packages. Like previous MP3 players from Creative Technology, this unit combines state-of-the-art features with good sound in a petite package. With 64MB of memory, an FM radio, and voice- and radio-record functions, the Nomad II MG should answer most needs for wired audiophiles—but that's only if they can afford its steep $399 price.

Still, you do get what you pay for: The sleek magnesium unit weighs less than 3 ounces and includes a SmartMedia memory slot, rechargeable batteries, neat collapsible headphones, and a USB docking cradle. And despite its abundance of features, it's still easy to use.

Control buttons for stop, fast-forward, rewind, and pause are placed along the sides of the unit for one-handed use. The display is on the small side, but it's equipped with a backlight and is fairly intuitive to navigate. The batteries took just under 2 hours to charge and lasted through about 8 hours of continuous use.

We found that the Nomad II MG delivered fairly rich sound and acceptable bass while playing MP3 files compressed at 96Kbps. The unit currently supports the MP3 and Windows Media Audio formats but is upgradable so users will be able to download support for future audio formats.

The relatively user-friendly Nomad II Manager software and fast USB connection make audio transfer painless. Transferring a full 64MB of audio from our PC to the Nomad II MG took just under 3 minutes, and the desktop software uses a simple Windows Explorer-type view for managing music files. The included MusicMatch software lets you rip tracks from your CD collection at a variety of compression rates.

Overall, the Nomad II MG delivers on the promise of MP3: It makes music truly portable, and unlike earlier players, it minimizes the headaches involved with file management and transfer. Although it'll take a serious bite out of your Gold Card, once you've bought the Creative Nomad II MG, you will never leave home without it.

—**R.S.S.**

★★★★
RATED 1 TO 5 STARS
👍 Packed with features; compact case; easy-to-use software
👎 Expensive; small display

PRODUCT:
Creative Nomad II MG
COMPANY:
Creative Technology
Milpitas, CA; 800-998-5227
www.nomadworld.com
MFR. EST. PRICE: $399

ZDNet **Price It!**
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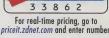
IBUYPOWER.COM POCKET ESPRESSO PC

Order Up a
PC to Go

USERS ON THE GO HAVE PLENTY OF COMPUTING choices—from handhelds to desktop replacements with megasize screens. But for the hard-core commuter—who needs equal computing power and access to the same files at multiple locations—a 6-pound laptop can be too much to carry, and a handheld is too limited. Enter Ibuypower.com's $1,128 Pocket Espresso PC (EPC), a unique portable computer designed for back-and-forth travelers.

Imagine the CPU box of your desktop boiled down to its barest essentials, and you have the 1-pound Pocket EPC. It's about the size and shape of a 300-page paperback and includes all the processing, memory, and connectivity hardware of a PC. All you have to provide is a monitor and keyboard. Our evaluation model contained a 533MHz Celeron CPU, 128MB of RAM, and a 6GB hard drive.

Our test model worked exceedingly well. We plugged in the included AC adapter; connected a 17-inch monitor, full-size keyboard, and wheel mouse to the Pocket EPC's standard ports (which also include S-Video and dual USB); and powered up the device without a hitch. You'll also find a built-in speaker, a 16-bit sound subsystem with audio-out and a built-in touch pad—so you don't need a mouse.

An included CD-ROM/floppy drive combo (which also includes parallel and serial ports) connects via a proprietary port. It doesn't support hot-swapping, but our evaluation module worked flawlessly. The Pocket EPC outshone even 600MHz Celeron desktops on Business Winstone 99, with a score of 19.9, while its Graphics WinMark score of 74.2 is standard for this processor class.

Ultimately, the Pocket EPC isn't for everyone. You'll need a monitor, keyboard, and modem/Ethernet card setup everywhere you go. We'd like to see the company offer a docking station that makes setup a one-step affair.

Nevertheless, there's no disputing that the Pocket EPC is reasonably priced for a portable PC, and it comes with a standard one-year warranty and 24-hour-daily toll-free tech support.

—*Asa Somers*

★ ★ ★
RATED 1 TO 5 STARS
👍 Superportability; good performance
💬 Requires separate monitor and keyboard

SYSTEM: Ibuypower.com Pocket Espresso PC
COMPANY: Ibuypower.com Los Angeles, CA
888-462-3899, 626-281-8262
ibuypower.com
AS TESTED: 533MHz Celeron; 128MB RAM; 6GB hard drive; 24x CD-ROM drive; 4MB shared video RAM; touch pad; Windows 98
DIRECT PRICE: $1,128

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PALM M100

A Pocketbook–
Friendly Palm

Best Buy
October 2000

IF YOU'VE MANAGED TO AVOID BUYING A Palm so far, it may be time to look twice. Palm wants to convert even more fans with its latest device, the Palm m100. Although it has a smaller screen and fewer programs than higher-end models, first-timers should be drawn to its rock-bottom price of $149 and curvy shape.

Lower-price Palm units have tended to be boxy and bland. That's clearly not the case with the tapered m100, which weighs in at a hand-friendly 5 ounces. Palm has even lifted a page from cellphone design: It offers snap-on cases in five different colors, for an estimated $19.95 each.

The screen is around three-quarters of the size of previous displays, but a higher resolution allows it to fit the same amount of detail onscreen. Still, you may find content such as street maps difficult to read. But the smaller screen gives the unit a sturdy feel, especially when combined with the windowed flip-cover. Unlike

previous covers, which jutted out at an annoying angle, this one rotates a full 360 degrees and lets you view a clock/calendar with the push of a button when shut.

The Memo Pad button has been replaced with a key for a new Note Pad jotter program (Memo Pad can be accessed with onscreen icons), and the Expense and E-mail applications have been omitted. Otherwise, the m100 retains Palm's user-friendly interface and applications, providing simple yet comprehensive management of contacts, appointments, tasks, and memos, not to mention thousands of third-party extras.

With 2MB of RAM and an IR port, there's plenty of room to swap contacts and games with other Palm fans. And the unit should last about a month on a pair of AAA batteries. Synchronizing with your desktop PC remains as effortless as ever, though the m100 comes with a serial cable instead of the traditional cradle (which is available separately).

The m100 is a pocket- (and pocketbook-) friendly unit that's sure to help Palm win over lots of beginners. Although the corporate crowd may be better served with more advanced models, it's only a matter of time until they're beaming appointments to their m100-wielding kith and kin.

—*Rick Broida*

★ ★ ★ ★ ★
RATED 1 TO 5 STARS
👍 Slick design; low price; it's a Palm
💬 Smaller screen

PRODUCT: Palm m100
COMPANY: Palm San Mateo, CA; 800-235-6325
www.palm.com
MFR. EST. PRICE: $149

ZDNet Price It!™
3 3 8 5 9
For real-time pricing, go to *priceit.zdnet.com* and enter number.

SOFTWARE

EXTENSIS PORTFOLIO 5.0

Create Order From PC Chaos

Best Buy
October 2000

IF YOU'VE BEEN SEARCHING FOR A WAY TO organize all the various media files on your PC, look no further than Extensis Portfolio 5.0. This powerful disk organizer makes it easy to catalog entire directories of files into thumbnail galleries, offers a superior selection of search and sorting tools, and features outstanding integration with SQL databases, enterprise networks, and the Web.

Setting up Portfolio is easy. Importing documents takes just a few minutes, and creating a new catalog of files is as simple as double-clicking on a directory name or dragging individual documents into an Extensis window. You can import any type of file, and merely selecting a document's thumbnail displays its contents or launches an editor. The intuitive, customizable interface includes handy dockable floating palettes and a comprehensive help function.

Portfolio's sorting and searching capabilities are equally impressive. Each document can be assigned an unlimited number of sort fields, as well as user-defined and system-generated keywords. And the program's flexible search engine can span multiple catalogs, using complex combinations of keywords and fields as search criteria.

One of Portfolio's greatest strengths is its near-seamless integration with distributed work environments and other media repositories. You can export catalogs as searchable Web pages that include active links between thumbnails and source documents. Users on different machines can even share catalogs through client/server or peer-to-peer connections.

Portfolio also offers useful features such as Digimarc watermarking, the ability to embed text annotations into graphics files, user-level password security, and system-generated slide shows that launch automatically when a catalog is opened. Portfolio even integrates AppleScript and Visual Basic scripting support, which lets you automate chores such as database publishing and database synchronization.

Extensis offers two upgrades for the software: The Portfolio Server module extends the program's catalog-sharing features to larger workgroups distributed across enterprise-wide TCP/IP networks, and the Portolio SQL Connect module makes it possible to integrate Portfolio catalogs with distributed Oracle and Microsoft SQL databases. Both modules add an extra layer of functionality to the software, although both come with hefty price tags.

Even on its own, though, Extensis Portfolio is one of the most flexible and usable media managers we've seen. It's fast, easy to use, and powerful enough to meet the needs of any organization.
—**Don Labriola**

★ ★ ★ ★ ★
RATED 1 TO 5 STARS
👍 Broad functionality; excellent network and database integration
👎 Expensive Server and SQL upgrades
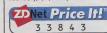
PRODUCT:
Extensis Portfolio 5.0
COMPANY: Creativepro.com
Portland, OR
800-796-9798, 503-274-2020
www.extensis.com
REQUIRES: 32MB RAM; 4MB hard disk space. Windows: Pentium CPU; Windows 95, 98, 2000, or NT 4.0. Mac: PowerPC; Mac OS 8.1 or later
MFR. EST. PRICE:
$199.95 (Portfolio 5.0); $2,499 (Portfolio Server 5.0 with five licenses); $7,500 (Portfolio SQL)

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For real-time pricing, go to
priceit.zdnet.com and enter number.

ASTOUND PRESENTATION 7.0

Astound the Competition

BUSINESSES OF ALL SHAPES AND SIZES DEPEND ON presentation-software packages. Armed with a cutting-edge program such as Astound Presentation 7.0 and a halfway-coherent outline, anyone in the office can quickly assemble a slide show of professional quality, complete with audio, video, and animation—a feat that would have been impossible just a few years ago.

Since its initial release, Astound has established itself as the nimblest presentation application available. Version 7.0 builds on that reputation with a raft of features aimed largely at distributed Web publishing. In fact, Astound blurs the line between conventional slide shows and Web publishing. The program can convert slides, complete with complex presentation effects such as

timelines, transitions, and path animation, to both static and dynamic HTML pages, and upload the entire package by FTP to your Web server. You can also use Astound to create a Web conference with the software's Internet Conference Center.

Despite the package's lack of documentation, Astound is easy to learn. You can use the stylish templates to create a slide-show prototype; add text, objects, sound, and movies; and orchestrate the show with sophisticated transition effects. And Astound's simple drag-and-drop interface and well-designed wizards make using relatively complex features—such as creating animations, interactive buttons and objects, image maps, and slides—a breeze.

Even if you already own a copy of PowerPoint, you might want to invest in Astound. You can open PowerPoint templates and presentations and add superlative special effects before publishing or packaging your show. Suffice it to say, Astound is still the pick of the presentation-graphics crop, and a must-have if you need to incorporate sophisticated multimedia into your presentations.
—**Susan Glinert**

★ ★ ★ ★
RATED 1 TO 5 STARS
👍 Excellent multimedia and Internet publishing features
👎 Poor documentation

PRODUCT:
Astound Presentation 7.0
COMPANY: Astound
Toronto, ON, Canada
877-278-6863, 416-207-0605
www.astound.com
REQUIRES: 32MB RAM; 40MB hard drive space; Windows 95, 98, 2000, or NT 4.0
PRICE: $395; $198 (upgrade)
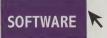
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ADOBE LIVEMOTION

SOFTWARE

Liven Up Your Web Creations

FOR THE LAST SEVERAL YEARS, MACROMEDIA HAS been the leading supplier of high-end multimedia Web-design tools. But its time as king of the hill may be coming to an end. Adobe Systems' LiveMotion lets you design and optimize animated rollovers, navigation bars, and other graphics for export to Flash or GIF format, and is the first product that truly goes head to head with Macromedia's multimedia-editing program, Fireworks.

Users of Illustrator and Photoshop will find the LiveMotion interface instantly familiar, because it shares the look and feel of those other Adobe products. Tabbed palettes provide quick access to a variety of attributes, such as opacity and 3D effects, and you'll find a new Timeline palette for adding and editing the animations. Documents in LiveMotion are composed of objects, such as geometric objects, text, or images. You create these objects by using the software's drawing tools, by importing them, or by dragging one from the well-stocked Library palette. An object's appearance and actions, such as sounds, textures, animation behaviors, and color, are then applied as attributes. Of course, the software supplies a library of predesigned effects that can be added to individual objects.

One of LiveMotion's coolest features is the way it handles animated text. You can break words apart into individual letters and animate them separately without losing the ability to edit the text or add new effects to it.

Another nice feature is the ability to link rollovers to an object state, which lets you simultaneously apply the same effect to several objects. And although LiveMotion is vector-based like CorelDraw and Illustrator, you can still take advantage of Photoshop filters. LiveMotion is well-matched against Fireworks, although for $299, the product is quite pricey (and about $100 more than the Macromedia product). Nevertheless, Web designers may find that the program's features and ease of use are worth the extra expense.

—Susan Glinert

★★★★
RATED 1 TO 5 STARS
👍 Superb drag-and-drop effects; copious export features
👎 No text along a path; expensive

PRODUCT: Adobe LiveMotion
COMPANY: Adobe Systems San Jose, CA
800-833-6687, 408-536-6000
www.adobe.com
REQUIRES: Pentium II or faster; 64MB RAM; 100MB hard drive space; Windows 98 or 2000, or NT with Service Pack 4
MFR. EST. PRICE: $299

ZDNet Price It!™
3 3 8 3 2
For real-time pricing, go to *priceit.zdnet.com* and enter number.

PEACHTREE COMPLETE ACCOUNTING 8.0

Adding It All Up On the Web

AS WE'VE SEEN WITH SEVERAL NEW DESKTOP accounting software packages, Peachtree Complete Accounting 8.0 seeks to make use of the Web's resources to enhance its own usefulness. This latest version of the venerable multiuser small-business accounting program does include some new accounting features, including several new business reports, but its most significant enhancement is the embedded Web browser that displays business-related information in new—and sometimes more useful—ways.

Nevertheless, the basic mechanisms of Peachtree Complete appear to be the same as in previous versions of the software. The same step-by-step wizard, for example, helps you get started with the program. All the modules that a small business needs, such as General Ledger, Accounts Receivable and Payable, Inventory, Payroll, Time Billing, and Fixed Assets, are still there. And the program still includes all the necessary forms for processing money in and out of your business, from checks to invoices to purchase orders. Getting around Peachtree Complete is easier, however, due to the more logically arranged menu system and graphical navigation tool. In addition to the 100-plus standard reports that come with the program, version 8.0 includes several new ones, such as a Tax Liability report and a Print by Vendor report. The software even includes a new Financial Report wizard, which walks you step by step through the process of building a financial report.

The most impressive update to Peachtree Complete, however, comes from the new Peachtree Today icon, which opens the embedded browser and the three screens to which the browser links. The Welcome screen displays a collection of housekeeping tasks, such as a list of common tasks, help files, and tips. In addition, the My Business screen provides a snapshot of your company's bottom line, including information such as aged receivables and payables, budget variance, and the like. Finally, the My Resources screen offers real-time information and resources from the Web, including a free tool for creating a limited Web site.

Peachtree remains one of the most powerful, customizable small-business accounting programs on the market. But unless you want the new Web-integration tools, little in Peachtree Complete Accounting 8.0 will make a compelling case for upgrading from version 7.0.

—Kathy Yakal

★★★★
RATED 1 TO 5 STARS
👍 Rock-solid features; strong usability tools
👎 Slight differentiation from previous version

PRODUCT: Peachtree Complete Accounting 8.0
COMPANY: Peachtree Software Norcross, GA
800-228-0068, 770-724-4000
www.peachtree.com
REQUIRES: 150MHz Pentium-class CPU; 32MB RAM (64MB recommended); 60MB hard drive space; Microsoft Internet Explorer 5.0; Windows 95, 98, 2000, or NT 4.0
LIST PRICE: $269.95
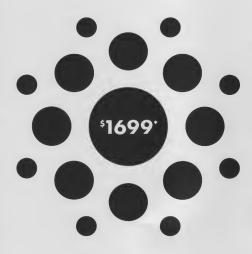
ZDNet Price It!™
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For real-time pricing, go to *priceit.zdnet.com* and enter number.

REAL ENTERTAINMENT CENTER PLUS

SOFTWARE

Entertainment Gets Real

★ ★ ★ ★ (RATED 1 TO 5 STARS)

You expect a lot from a program that's touted as the PC's answer to a home entertainment center. And although RealNetworks' new Real Entertainment Center Plus delivers on much of that promise—bundling updated versions of its popular

RealJukebox, RealPlayer, and RealDownload software into a single package—the result may leave you wanting more.

The centerpiece of Real Entertainment Center Plus is the much-improved RealJukebox 2. No longer a simple MP3 jukebox program, RealJukebox has matured into a powerful multimedia-file player and organizer. The software now supports a wide range of file formats,

including MP3, RealAudio, WAV, and Windows Media (WMA). CD recording has been noticeably improved as well, and you can even cross-fade your music DJ-style for nonstop play. In addition, more audio plug-ins are included, more portable MP3 players are supported, and more skins are available for download. RealJukebox 2 even sports a new browser-like interface that makes using the program a lot easier.

The package also includes Real-Player 8, a new version of RealNetworks' flagship software package, which now boasts VHS-like video streaming over broadband Internet connections, higher video frame rates when using dial-up connections, and MP3 streaming support for files that reside on RealServers. RealDownload 4, meanwhile, is a great program for managing your file downloads. You can pause a download, resume where you left off if disconnected, or group multiple files into a single session. The program installs into your browser and appears whenever you download a file.
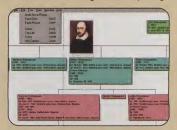
GENERATIONS GRANDE SUITE 8.0

Uncovering Your Roots

★ ★ ★ ★ (RATED 1 TO 5 STARS)

Every family has a unique and elaborate history that's waiting to be told. Unfortunately, keeping track of it all can prove rather frustrating. Whether you're just starting out or have been investigating your ancestry for years, SierraHome's Generations Grande Suite 8.0 can help simplify your efforts with some of the most powerful, comprehensive, and easy-to-use genealogical tools ever assembled in a single software package.

Setup is a breeze. A concise tutorial covers all of the software's essential features, which range from basic family-tree charting to more complicated genealogical searches. You can start by generating family cards with the information already available to you, such as the names, birthdays, occupations, and miscellaneous biographical notes of immediate relatives. Designating relationships such as spouse, mother, father, and child will automatically link individuals accordingly.

Generations' drag-and-drop interface lets you easily customize your family tree and add photos, video clips, and audio clips to individual entries. You can also generate statistical reports, timeline charts, and other informative documents. Most impressive is a new feature that lets you generate a 3D family tree. You can then tilt, zoom, and otherwise manipulate the available charts, complete with attached photos.

Spanning 31 CD-ROMs, Generations is not limited to the information you provide. The software includes access to more than 350 million names and resources, the entire digitized 1800 U.S. Census, Civil War muster rolls, the Social Security death index, and links to more than 60,000 genealogy Web sites. In addition to the software, SierraHome also includes the book *Netting Your Ancestors: Genealogical Research on the Net*, a guide to online heritage quests by genealogy guru Cyndi Howells.

To add a truly personal touch to your biological quest, you can use the bundled version of MasterCook Heritage Edition software to preserve family recipes alongside the appropriate family photos and clip art. And you can post all of your findings (culinary and otherwise) online, where your descendants may well enjoy them for generations to come. *(SierraHome; $89.95;* **www.sierrahome.com***)*
—*Avital Fryman*

While all three programs perform their respective tasks with aplomb,

Real Entertainment Center does a poor job of integrating them into one seamless product. For instance, RealJukebox supports WMA files, but RealPlayer does not. And though you can integrate AOL Instant Messenger 4 into Real-Player, you can't do the same with RealJukebox.

Ideally, RealNetworks should integrate all three of these programs into one distinct entertainment application. Until that time, however, you can download a free version of Real Entertainment Center—or each component program—from the company's Web site. The free versions offer most of the functionality of the retail versions and may be all you need to set up your own entertainment center. —*David English*
(RealNetworks; $49.99; **www.real.com***)*

CANON OFFICEREADY BUSINESS PLANS

Getting Down to Business

★ ★ ★ (RATED 1 TO 5 STARS)

Whether you hope to start your own business or work your way up the corporate ladder, chances are you'll need to write a business plan at some point. For those who have never done so before, it can be a daunting task. Fortunately, Canon Software's OfficeReady Business Plans is here to help.

OfficeReady may install as a separate program, but it uses Microsoft Word as its authoring environment, letting you create your business plans in an application you are probably already familiar with.

The program lets you choose from several pre-existing business-plan templates for various types of companies, such as e-commerce or Internet startups, or lets you *create your own customized*

plans that meet your exact specifications.

OfficeReady also features a Walk-Thru wizard that helps you with each step of the creation process, offering helpful instructions for the various sections of your plan. In addition, OfficeReady lets you insert graphics, as well as linked financial data in the form of Excel worksheets, freely throughout your document.

Once your plan is completed, you can print it, e-mail it, or publish it as an Excel workbook or PowerPoint presentation. OfficeReady even lets you publish your plan to the Web as a personal home page on a Canon-hosted site. This feature is invaluable, because it lets you distribute your business plan over the Internet, even if you have little or no experience with HTML.

Ultimately, OfficeReady provides a powerful business-plan authoring solution in an easy-to-use, familiar environment. Now all you need is that million-dollar idea. —*Richard Douek*
(Canon Software; $89.95;
www.software.canon.com*)*

ZDNet Price It!™ | code
Canon OfficeReady Business Plans | **33829**
Generations Grande Suite 8.0 | **33833**
Real Entertainment Center Plus | **33835**

For real-time pricing, go to priceit.zdnet.com and enter number.

GAMES

BACKYARD BASEBALL 2001

The Sandlot Goes Digital

★ ★ ★ ★ (RATED 1 TO 5 STARS)

Baseball season may be winding down to the final innings, but with Humongous Entertainment's Backyard Baseball 2001, kids can find year-round enjoyment with the boys (and girls) of

summer. A baseball simulation designed for children between the ages of 5 and 12, Backyard Baseball provides plenty of customizable options, several modes of play, and Humongous' typically superb animation.

In addition to selecting their own team names and uniform colors, players can choose their favorites from all 30 Major League ball clubs. In addition, a Create a Player function lets youngsters join in the onscreen action by fashioning their own team member. Better still, kids get to play alongside junior versions of well-known ballplayers such as Mark McGwire, Mike Piazza, Sammy Sosa, and Mo Vaughn.

The game provides a rich variety of gameplay—including season play, in which young coaches face off for a

14-game season; a batting practice mode; single games against the computer; and even spectator games that let you sit back and watch the computer play against itself. Kids can also play free online against other human opponents on the secure Humongous Sports Neighborhood service.

Although we have some reservations about recommending the game for the kindergarten crowd (our 6-year-old tester had a rough time of it at the easy setting), we have no doubt that older children—and more often than not, their parents—won't want to put it down. Once again, Humongous knocks one out of the park.

—*Steve Schwartz*
(Humongous Entertainment; $19.99;
www.humongous.com)

MOTOCROSS MADNESS 2

Two Wheels In Motion

★ ★ ★ (RATED 1 TO 5 STARS)

Microsoft Corp.'s much-debated approach to competition hasn't stopped the company from producing some terrific racing games. Case in point: Motocross Madness 2, which delivers more great motorcycle racing, jumping, and bone-crushing wipeouts.

If you enjoy arcade-style racing and don't mind dispensing with real-world physics, this is the game for you. Moto-

cross Madness 2 lets you choose a cycle, dress your rider (in anything from jeans to leather), and compete in six different events: Baja, Stunts, Nationals, Supercross, and the new Enduro and Pro Circuit. Enduro challenges you to race on

theme-oriented tracks filled with traffic and "working" objects (such as trains and farm equipment), while Pro Circuit puts money on the line as you race for cash and bike upgrades.

Motocross Madness 2 looks as lush and dynamic as the original did in its day, with support for ultrahigh resolutions and nicely detailed scenery. Unfortunately, the game crashed repeatedly on a system with a Matrox G400 graphics card, and we found no support help on Microsoft's Web site. It did run properly with other cards, however.

As with most racing games, competing against yourself or other human players (on Microsoft's Zone.com) is far more enjoyable than tackling the computer opponents, which are unrealistically infallible. All told, Motocross Madness 2 is like cotton candy—a rush of sweetness, but ultimately not very filling. —*R.B.*
(Microsoft Corp.; $44.95;
www.microsoft.com)

DIABLO II

A Devil of a Good Time

★ ★ ★ ★ (RATED 1 TO 5 STARS)

Blizzard Entertainment's Diablo became an instant classic upon its release in 1997. Now, after three-plus years and countless delays, the long-awaited sequel has arrived, and it doesn't disappoint.

Diablo II bears a striking resemblance to the original, albeit with some worthwhile improvements. Visually, it looks amazing, with dazzling new lighting and spell effects, and plenty of cartoonish gore. Alas, you're limited to playing at 640x480 resolution—a definite disappointment.

As in the original, you choose a character class (there are now five instead of three) and embark on various treasure-seeking, monster-slaying quests. Among the best gameplay tweaks are randomized maps, a permanent storage chest for precious items, spells that can be assigned to function keys, and characters that can run. Blizzard's Battle.net multiplayer service has been improved as well. Although it still suffers some lag, the service has effectively eliminated the cheating that virtually ruined the original Diablo.

Diablo II's revamped save-game feature is a point of contention, however. You can't save without exiting the game, but when you return, you wind up back at home base. Meanwhile, all the monsters have regenerated, and the portal-like waypoint system simply returns you to the general vicinity of where you started.

That said, Diablo II is still a blast to play. Fans of the original might not find it quite as innovative as its predecessor, but that won't stop them from getting swept up all over again. —*Rick Broida*
(Blizzard Entertainment; $59.95; **www.blizzard.com**)

STAR TREK: KLINGON ACADEMY

The Heart of a Warrior

★ ★ ★ ★ ★ (RATED 1 TO 5 STARS)

Best Buy October 2000

The year 2000 looks like it will be a good one for *Star Trek* games. Springtime brought us Activision's splendid Star Trek: Armada, and now Interplay has served up Star Trek: Klingon Academy—arguably the best *Star Trek* game to date, and an excellent space-combat simulator to boot.

As a young cadet in the Klingon Defense Forces Elite Command Academy, you'll rise through the ranks by completing various story-driven missions, many of which involve Chancellor Gorkon and General Chang (roles reprised by David Warner and Christopher Plummer, respectively).

The experience of cap-

taining a Klingon warship is simply thrilling. Using a combination of a joystick and numeric keyboard commands, you simultaneously pilot the vessel and control all ship systems, from propulsion to engineering to the cloaking device.

Klingon Academy's graphics aren't quite state-of-the-art, but you rarely notice, thanks to some wonderful visual effects (including burning hulls and leaking plasma trails). Plus, the game's live-action sequences are nothing short of feature-film quality.

If you'd rather skip the 25 lengthy, smartly designed missions, you can create some truly spectacular skirmishes (such as, say, one Klingon bird of prey against three Federation starships) or venture online for multiplayer battles.

Klingon Academy arrives on a whopping five CDs—a missed opportunity for Interplay to deliver a worthwhile game on DVD. That gripe aside, this is a must-have for Trekkers and space-combat fans alike. —*R.B.*
(Interplay; $49.99; **www.interplay.com**)

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Backyard Baseball 2001	33834
Diablo II	33823
Motocross Madness 2	33836
Star Trek: Klingon Academy	33824

For real-time pricing, go to priceit.zdnet.com and enter number.

LIGHT MAKES RIGHT

BY RICK BROIDA

These five featherweight notebooks push the boundaries of portable potential.

For too long, business travelers have faced a Faustian bargain of either lugging along a hefty, full-featured notebook or getting by with a bare-bones, and often underpowered, subnotebook. But the latest bunch of ultraportable models offer a suitable compromise. These units pack powerful processors, roomy hard drives, and spacious screens but save pounds and bulk by opting for smaller batteries and external floppy and DVD-ROM or CD-ROM drives.

Indeed, while not intended to serve as desktop replacements, the five notebooks we gathered for this roundup have sufficient horsepower for conventional business-computing tasks. And because each weighs less than 4.5 pounds (battery included), you won't have to schedule an appointment with your chiropractor at the end of your trip.

The systems are thinner and more compact than average, too, though to widely varying degrees. Compaq's amazingly svelte Armada M300, for instance, measures just 0.9 inches thick and a mere 10.5 inches wide, while the comparatively hefty HP OmniBook 900 stands nearly 1.25 inches tall and measures more than 11.5 inches across.

These ultraportable systems also take different approaches to lightening your load. The Armada and IBM ThinkPad

ULTRAPORTABLE NOTEBOOKS

570E 6AU rely on underbelly docking stations that add expansion ports, drive bays, and room for a second battery. The Dell Latitude LS and HP OmniBook, which have most of their expansion options built in, use external CD-ROM and floppy drives. The Toshiba Portégé 3440CT, meanwhile, falls somewhere in between, with a large external module that combines a drive bay with a variety of expansion ports.

There are, of course, benefits and shortcomings to each approach, as we point out in the following individual product reviews. Perhaps the most important factor to bear in mind is battery life. The ThinkPad, for instance, one of the largest portables in the group, turned in the shortest battery time on our BatteryMark test. The much more petite Latitude LS, meanwhile, managed to run nearly an hour longer.

Speaking of tests, only the Toshiba Portégé was able to complete our 3D WinBench 2000 suite, due to its cutting-edge S3 Savage IX graphics accelerator. The other systems failed 3D WinBench, owing to outdated video drivers, older graphics processors, or both. If you're hoping to play games in your downtime, look for a notebook with an ATI Rage Mobility or S3 Savage chip set and at least 4MB of memory.

One might expect to find small, low-resolution screens on notebooks weighing under 4.5 pounds, but the average display size was a roomy 12.1 inches. Only the Portégé's screen was smaller, at 11.3 inches, but even that seemed adequate for tasks like word processing and Web browsing. The ThinkPad pushed the envelope with its eye-pleasing 13.3-inch display.

Just because a notebook has a diminutive frame doesn't mean it lacks expandability. All five systems have at least one USB port and PC Card slot; two also provide built-in Ethernet support. Two of the notebooks have DVD-ROM drives as well—handy when you want to watch your own in-flight movie. (Headphones are a must, however, as wimpy speakers are indigenous to the category.)

It's also gratifying to see that all five vendors offer 24/7 toll-free technical support, although we'd prefer to see three-year warranties across the board as well. The Armada and Portégé are backed for only one year, so check out their extended warranties to protect your investment.

COMPAQ ARMADA M300 ★ ★ ★ ★

PROS: Fast 600MHz processor; small, lightweight case; large 12GB hard drive; excellent modular design
CONS: One-year warranty; slow application performance; lack of bundled applications; relatively small keyboard

ULTRAPORTABLE NOTEBOOKS

Boasting a leading-edge design, rock-solid performance, and the fastest processor in the group, the Compaq Armada M300 quickly qualifies as a popular choice for power users on the move. It's also one of the smallest units here, measuring a scant 0.9x10.5x9.5 inches (HWD) and weighing just 3.4 pounds with its battery attached.

Given its pack-leading 600MHz Pentium III processor, it's no surprise that the Armada turned in above-average benchmark scores, but it was bested by most of the other systems in the comprehensive Business Winstone 99 test. While it may have the fastest processor, it's not necessarily the fastest performer.

The Armada's modularity, however, is truly remarkable. Its tube-shaped external battery, for instance, hooks easily onto the rear of the unit and can pivot 90 degrees to become a stand (and to expose the rear expansion ports) when you're working at a desk. Alternately, you can drop the Armada onto its optional underbelly docking station, which duplicates the expansion ports, adds line-in and line-out audio jacks, and supplies two drive bays. The latter can accommodate a secondary battery and a variety of drives, including floppy, CD-ROM, DVD-ROM, SuperDisk LS-120, and hard drives. The docking station costs $399 with a CD-ROM drive or $499 with a DVD-ROM.

Our review unit came with a floppy drive (included in the purchase price and also able to plug into the notebook's parallel port) and a DVD-ROM, bringing the total weight of the docking bay to just 2.5 pounds, still light enough to keep in your travel bag.

Even without the dock, the Armada has

Compaq Armada M300

virtually everything you need for road duty, including a 12GB hard drive, a V.90 modem, an Ethernet adapter, one USB port, and a Type II PC Card slot. Based on our tests, you can expect at least 2 hours of work time from the external battery.

As we've seen in other recent Compaq notebooks, the M300 includes four programmable extra buttons that can be used to quick-launch your browser, e-mail program, or any other software. Its keyboard, while a bit smaller than most of the others

< FEATURE COMPARISON >

	Compaq Armada M300	Dell Latitude LS H400ST	HP OmniBook 900	IBM ThinkPad 570E 6AU	Toshiba Portégé 3440CT
BASE PRICE	$2,899	$2,402	$1,999	$3,094	$2,199
OPTIONAL COSTS	$499 (docking station with DVD-ROM drive)	$99 (CD-ROM drive)	$255 (CD-ROM drive)	$244 (docking station with CD-ROM drive)	$778 (port replicator and DVD-ROM drive)
TOTAL PRICE AS TESTED	$3,398	$2,501	$2,254	$3,338	$2,977
CONFIGURATION					
Processor	600MHz Pentium III	400MHz Pentium III	450MHz Pentium III	500MHz Pentium III	500MHz Pentium III
SDRAM Installed/Maximum*	64MB/320MB	128MB/256MB	64MB/320MB	128MB/320MB	64MB/192MB
Dimensions (HWD, Inches)	0.9x10.5x9.5	1x10.7x8.7	1.25x11.8x8.8	1.1x11.8x9.4	0.8x10.3x9.1
System Weight/Travel Weight** (Pounds)	3.4/6.5	3.5/5.8	4.0/6.5	4.0/6.9	3.4/4.1
TFT Screen Size (Inches)/Native Resolution	12.1/1,024x768	12.1/800x600	12.1/800x600	13.3/1,024x768	11.3/1,024x768
Graphics Accelerator/RAM Installed	ATI Rage LT Pro/4MB	NeoMagic MagicMedia 256AV/2.5MB	ATI Rage Mobility/4MB	NeoMagic MagicMedia 256AV/2.5MB	S3 Savage IX/8MB
Hard Drive Rated Size/Manufacturer/rpm*	12GB/IBM/4,200	6GB/IBM/4,200	6GB/IBM/4,200	12GB/IBM/4,200	6GB/Toshiba/4,200
Docking-Station/Port-Replicator Option*	Yes/yes	No/yes	Yes/yes	Yes/yes	No/yes
Manufacturer/Rated Speed/CD-ROM or DVD-ROM Drive	Toshiba/8x/DVD-ROM	Toshiba/24x/CD-ROM	Toshiba/24x/CD-ROM	IBM/24x/CD-ROM	Toshiba/6x/DVD-ROM
DVD Decoder Software	Compaq DVD Express	NA	NA	NA	Mediamatics DVDExpress
Sound Processor*	Compaq PremierSound	NeoMagic MagicMedia 256 Audio	ESS Maestro	Sound Blaster Pro	Yamaha YMF752
Built-In Modem/Ethernet	Yes/yes	Yes/yes	No/no	Yes/no	Yes/no
Pointing Device	Touch pad	Touch pad	Touch pad and pointing stick	Pointing stick	Pointing stick
Ports***	One parallel, one serial, one VGA, one USB, one IR	One parallel, one serial, one VGA, one PS/2, one USB	One parallel, one serial, one VGA, one USB, one IR, one PS/2	One parallel, one serial, one VGA, one USB, one PS/2, one IR	One VGA, one USB, one IR
Audio Connectors	Headphone, microphone	Headphone, microphone	Line out, microphone, headphone	Line out, microphone, headphone	Headphone, microphone
PC Card Slots	One Type II	One Type II	Two Type II	Two Type II	Two Type II
Includes Carrying Case	No	No	No	No	No
Max. Number of Installed Batteries	One	One	One	One	Two
Rated Battery Charge Time with System Off/On (Hours)	2/2	1.5/1.5	1.5/1.5	2.5/3	3/4
SOFTWARE INCLUDED	Windows 98 Second Edition, RingCentral Fax	Windows 98 Second Edition	Windows 98 Second Edition, McAfee VirusScan	Windows 98 Second Edition, Lotus SmartSuite Millennium, Norton Mobile Essentials, Norton AntiVirus, RingCentral Fax, ConfigSafe, IBM Update Connector, PC-Doctor	Windows 98 Second Edition, RingCentral Fax
SERVICE AND SUPPORT*					
Money-Back Guarantee/Restocking Fee	Yes/no	Yes/no	Yes/no	Yes/no	NA/NA
Standard Warranty (Parts and Labor)	One year	Three years	Three years	Three years	One year
Extended/Upgraded Warranties	$149 for three years onsite	$169 for CompleteCare upgrade	$199 for two years onsite	$49 for one year onsite	$79 for one year onsite
Live Toll-Free Tech-Support Hours	24 hours daily	24 hours daily	24 hours daily	24 hours daily	24 hours daily
Online Tech Support	Yes	Yes	Yes	Yes	Yes
Who Pays for Shipping Under Warranty	Vendor both ways	Customer	Vendor one way	Vendor both ways	Vendor both ways

NA = Not applicable   * = According to vendor or manufacturer   ** = Includes weight of floppy drive, CD/DVD drive, and AC adapter
*** = Ports on notebook only; additional ports may be found on port replicators/docking stations

in the group, felt surprisingly comfortable.

The Armada's only real shortcomings are its price—a total of $3,398 for the system and the docking station—and its lack of bundled software. Save for RingCentral Fax, the only software included is Windows 98 (or Windows 2000, if you prefer). Nevertheless, the Armada M300 is a smartly designed notebook that's sure to please weight-weary travelers.

DELL LATITUDE LS H400ST ★ ★ ★ ★

PROS: Three-year warranty with next-business-day onsite service; compact, lightweight design; good application performance
CONS: No serial port; below-average graphics performance

Y ou can't judge a notebook by its processor, as evidenced by the Dell Latitude LS H400ST, which has a base price of $2,402. Though equipped with a 400MHz Pentium III CPU—assumed to be the slowest in the roundup—the system achieved second-place Business Disk WinMark and Business Winstone scores, helped along by its 128MB of SDRAM. Not bad for a system that weighs just 3.5 pounds and measures only an inch thick.

Indeed, the Latitude is a decidedly travel-friendly portable—if your travel plans don't include floppy or CD-ROM drives. Both are external, plugging into the notebook's parallel and expansion ports, respectively, and requiring extra room around the notebook. (The floppy drive can also swap into the plastic case that houses the optional $99 24x CD-ROM that was included with our configuration.) Using either drive while balancing the Latitude on your lap or an airplane tray table would be difficult at best.

Moving toward a legacy-free design, the Latitude has no serial port—a potential problem for users of digital cameras, handheld PCs, and other peripherals. It also lacks an IR port but has the more important PS/2 and USB connectors. A V.90 modem, an Ethernet adapter, and a Type II PC Card slot are standard equipment, as are the 800x600-pixel 12.1-inch TFT screen and 6GB hard drive. (You can upgrade to a drive that's twice as big for a mere $70.)

While the Latitude produced above-average benchmark scores overall, its NeoMagic graphics chip earned very low marks. This notebook may not be the best choice for graphics-minded users, but at least it won't peter out in the middle of a spreadsheet: Its battery lasted nearly 2.5 hours in our rundown test.

The Latitude features a large, comfortable keyboard and touch pad, but its cursor-control keys are inconveniently

ULTRAPORTABLE NOTEBOOKS

spread out. Some quick-launch and auto-scroll buttons would be welcome.

Dell's Web site makes it surprisingly difficult to locate the Latitude, which is in the Small Business Center, but not the Home Office area. Once you've reached the configuration screen, however, you'll find a wealth of customization and accessory options. The one noticeable omission is a DVD-ROM drive; only a CD-ROM is available. For an

Dell Latitude LS H400ST

extra $85, you can opt for Windows 2000; for an extra $274, you can own Office 2000 Small Business. Those are your only software options, and no applications or utilities come bundled with the system.

Dell's exemplary warranty covers parts and labor for three years and includes next-

business-day onsite service. The optional CompleteCare upgrade includes coverage for accidental damage (like drops and spills). Though the Latitude LS doesn't stand out with any particularly impressive features, it's a slim and likable notebook at a reasonable price.

(Note: As we went to press, we received word that Dell had upgraded the processor of the Latitude LS H400ST to a 500MHz Pentium III. Everything else about the system, including the price, remains unchanged.)

HP OMNIBOOK 900 ★ ★ ★

PROS: Low price; three-year warranty; large, comfortable keyboard; good software bundle
CONS: Bulky, heavy case; slow application performance; lacks modem and Ethernet support

A lthough HP's OmniBook 900 is the thickest and slowest notebook in this group (not to mention one of the heaviest), it is also the least expensive, with a base price of just $1,999. The OmniBook weighs 4 pounds and stands 1.25 inches tall, making it seem like a behemoth next to the lilliputian Compaq Armada M300 and Toshiba Portégé 3440CT. Indeed, it looks and feels more like a traditional notebook than an ultraportable, but it makes the cut due to its reasonably light weight.

Built with a 450MHz Pentium III processor, 64MB of RAM, and a 6GB hard drive, the OmniBook turned in the lowest Business Winstone score of the five systems here and mostly below-average scores on our other tests. Fortunately, its ATI Rage Mobility-based graphics subsystem saved

Tools of the Road

A lthough today's notebooks come packed with more capabilities than ever, there's always room to accessorize. These three items can make the trip a bit easier for any road warrior.

MOBILITY EASIDOCK USB 200E
(www.easidock.com)
Though most notebooks have serial, parallel, and USB ports, very few have more than one of each. Enter Mobility Electronics' EasiDock USB 200E, a $150 peripheral that supplies one serial, one parallel, one Ethernet, two PS/2, and five USB ports—all with a single USB connection. With that kind of expandability, virtually any notebook can double as a desktop system.

NESCO SMARTADAPTER PLUS
(www.nescobatteries.com)
Finding an AC outlet for your notebook is no mean feat when you're cruising at 35,000 feet or stuck in the back of a cab.

But Nesco Battery Systems' $80 Smart-Adapter Plus comes with the adapters you need to plug into any 12-volt DC outlet, be it in a plane, train, boat, or car.

NEW MEDIA MOBILE GAMER
(www.newmediatechcorp.com)
It's the rare notebook that has a joystick port—a problem if you're in the mood to kick back with your favorite game at the end of the day. Fortunately, most notebooks have at least one PC Card slot, and that's where New Media Technology Corp.'s Mobile Gamer comes into play. This Type II PC Card sells for about $60 and supplies connectors for one four-axis joystick or two two-axis joysticks. It even supports force-feedback controllers. ▼

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ULTRAPORTABLE NOTEBOOKS

the day with strong performance, making the OmniBook an acceptable platform for business-graphics software and even games.

Like the Dell Latitude, the OmniBook relies on external floppy and CD-ROM drives.

HP OmniBook 900

The floppy is included; the 24x CD-ROM drive costs an additional $255. Unlike the Latitude's, the drives can't be used simultaneously; both vie for space in the included external module bay (which can also accommodate a DVD-ROM, LS-120, or Zip drive).

The OmniBook was one of three notebooks included here to arrive without built-in Ethernet support, and the only one that lacked a modem. It does have a pair of Type II PC Card slots, so you can add both options with relative ease. (All the other standard expansion ports are here as well, including USB and PS/2.) And while we think the omission of a modem borders on sacrilege, it's hard to argue with the notebook's total price of $2,254—by far the lowest in the group.

One benefit to the OmniBook's larger form factor is its full-size, full-comfort keyboard with properly arranged cursor-control keys. The OmniBook supplies both a point-

ing stick and a touch pad, and they can operate simultaneously (so you can instantly switch back and forth between them).

It takes a few clicks to drill through HP's online shopping area and find the OmniBook 900, which is available with a variety of additions and upgrades. But the DVD-ROM and Zip drives were inexplicably missing from the accessory list, and the overall shopping-cart system was nowhere near as polished as Compaq's or Dell's, for instance.

HP backs the OmniBook with a generous three-year warranty and supplies virus-scanning, system-diagnostic, and online-help software. While there are thinner, lighter, and better-equipped portables in the group, if you want to travel reasonably light while keeping your investment to a minimum, the OmniBook 900 may be the answer.

IBM THINKPAD 570E 6AU ★ ★ ★

PROS: Large 12GB hard drive; 13.3-inch screen; superior application performance; comfortable keyboard; good software bundle
CONS: Poor battery performance; thick, heavy case; bulky docking station

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Although it's one of the biggest and heaviest systems included here, the IBM ThinkPad 570E 6AU comes with amenities such as a big screen, a large 12GB hard drive, and lots of software. These luxuries do not come cheaply, however—at $3,094, the ThinkPad also has the highest base price.

By itself, the 500MHz Pentium III-powered ThinkPad tips the scales at 4 pounds and measures just over an inch thick. It's also a briefcase-compro-

mising 9.4 inches deep, lending an unusually big feel to the notebook. The source of the extra depth is the 13.3-inch TFT screen, the largest display here.

The included external floppy drive can plug into the notebook or slide inside the optional $115 UltraBase docking station. This underbelly accessory sports a second battery bay, two drive bays, a joystick port (a rare find in any notebook), and a second USB port. The drive bays can hold a CD-ROM, DVD-ROM, Zip, or second hard drive; ours came with a 24x CD-ROM.

Versatile though it may be, the UltraBase turns the ThinkPad into a mammoth that's more than 2 inches tall

IBM ThinkPad 570E 6AU

and weighs nearly 7 pounds. We wouldn't want to lug this thing onto a plane. But the second battery would definitely come in handy. While the ThinkPad proved to be a top performer, turning in the highest Business Winstone score, it had the worst battery life. It was the only notebook in the group that didn't make it past 2 hours—in fact, it barely exceeded 1.5 hours.

Users who do a lot of word processing will appreciate the ThinkPad's desktop-caliber keyboard, the largest and most comfortable we laid hands on. Alas, it still lacks something as basic as a Windows key, and that's part of a bigger problem: its staid design. The ThinkPad line looks virtually the same now as it did three years ago—no quick-launch or auto-scroll buttons, no CD-playback controls, no recent design innovations whatsoever.

Also, IBM continues to

< COMPUTER SHOPPER BENCHMARKS > HIGHER SCORES ARE BETTER	Compaq Armada M300 (Best Buy)	Dell Latitude LS H400ST	HP OmniBook 900	IBM ThinkPad 570E 6AU	Toshiba Portégé 3440CT	Benchmark System: Quantex W-1511
PROCESSOR TYPE	600MHz Pentium III	400MHz Pentium III	450MHz Pentium III	500MHz Pentium III	500MHz Pentium III	500MHz Pentium III
SYSTEM MEMORY	64MB	128MB	64MB	128MB	64MB	128MB
NATIVE RESOLUTION	1,024x768	800x600	800x600	1,024x768	1,024x768	1,024x768
APPLICATION PERFORMANCE Business Winstone 99 65,536 Colors @ Native Resolution	19.2	21.0	19.0	21.7	21.0	22.8
BATTERY LIFE BatteryMark 3.0 (hours:minutes)	2:10	2:20	2:23	1:34	2:50	3:13
PROCESSOR SUBSYSTEM CPUmark 99	55.2	38.1	42.3	47.1	47.8	47.2
GRAPHICS SUBSYSTEM Business Graphics WinMark 99 65,536 Colors @ Native Resolution	159	111	162	170	161	167
16.8 Million Colors @ Native Resolution	94.6	69.1	132	53.4	101	127
3D WinMark 2000 65,536 Colors @ 640x480	NA	NA	NA	NA	36.0	18.9
65,536 Colors @ 800x600	NA	NA	NA	NA	26.6	15.0
DISK SUBSYSTEM Business Disk WinMark 99	2,170	2,240	1,950	2,360	2,020	2,090
NA = Not applicable						

bundle Lotus SmartSuite, a powerful though generally less desirable office suite. We suspect most users would rather have no suite at all and pay a bit less. Other bundled software includes Norton Mobile Essentials, Norton AntiVirus, and RingCentral Fax, all welcome applications.

It takes a lot of clicking to find the ThinkPad 570E on IBM's Web site. The configuration screen offers few customization options (RAM, yes; hard drive, no), but does list dozens of accessories. With its high price, subpar battery life, and excessive bulk, the ThinkPad 570E 6AU merits consideration only for those who insist on a large screen.

TOSHIBA PORTÉGÉ 3440CT ★ ★ ★

PROS: Low base price; good battery life; thin, lightweight case; superior 3D-graphics performance; good application performance

CONS: Expensive port replicator and DVD drive; small screen; one-year warranty; inferior pointing stick and keyboard; awkward mouse-button arrangement

With a base price of $2,199, the Toshiba Portégé 3440CT seems like a great deal—until you add the pricey port replicator ($399) and DVD-ROM drive ($379), both of which were included with our review system. Together, they bump the total cost up to $2,977.

Price notwithstanding, it's hard not to like the Portégé, if only because it's so amazingly thin (0.8 inches) and light (3.4 pounds). That compactness belies the respectable horsepower within: a 500MHz Pentium III processor and a state-of-the-art S3 Savage IX graphics accelerator.

The graphics accelerator was the only one in the roundup to complete our 3D WinMark 2000 tests successfully, and it blew the doors off our baseline system's scores. Whether you're into 3D modeling or Quake III, the Portégé lets you do your thing. The rest of the Portégé's scores were similarly on the high side, and the DVD-ROM drive topped the chart in the CD-ROM WinMark 99 test.

The notebook ruled the BatteryMark test, too, but there's a caveat: We were unable to disable Toshiba's built-in power-management utility, and while we did tailor its settings to match the test's requirements, we can't be positive they functioned like Windows' own power settings. In other words, your mileage may vary.

From an expansion standpoint, the Portégé supplies just the essentials: a pair of Type II PC Card slots, a 56Kbps modem, SVGA and USB ports, and headphone and microphone jacks. If you need parallel, serial, PS/2, or Ethernet connections, you'll find them on the included LAN Port Replicator, which also supplies an additional USB port. These same ports and more are duplicated on the optional Multimedia Port Replicator, which also provides the necessary drive bay for the DVD-ROM drive. Problem is, this replicator is thicker than the Portégé and almost as heavy. Using it anywhere but on a desk would be a major inconvenience.

We also disliked the Portégé's pointing stick, which we found stiff and too deeply recessed. And the keyboard was the worst in the group, with its surprisingly shallow keys. But the biggest disappointment came from the mouse-button arrangement. There's a side-by-side pair below the space bar, which, inexplicably, scroll up and down in documents and Web pages, and a stacked pair below those.

Toshiba Portégé 3440CT

The whole setup seems illogical and is awkward to use.

Toshiba supplies just one piece of software (RingCentral Fax) and a one-year warranty. Though you can buy Portégé accessories online, Toshiba doesn't sell the notebook itself online, so there are no customization options to speak of.

Add to it all the smallest screen in the group—11.3 inches—and the Portégé comes up wanting. The featherweight frame is definitely a delight, but Compaq's similarly buoyant Armada offers smarter design and a better value.

LESS WEIGHT, MORE FILLING

If you've longed to bid goodbye to boat-anchor notebooks, now's the time. These back-friendly bantamweights weigh upwards of 70 percent less than some portables we've seen, yet offer surprisingly few compromises in terms of performance and expandability. Sure, you might have to live with a 12-inch screen and settle for 2 hours of battery life instead of 4 (always pack a spare cell), but these are small prices to pay for the business traveler looking to lighten the load significantly.

As you shop, keep in mind that not all notebook manufacturers excel at making ultraportable notebooks. Toshiba and IBM, for instance, usually hit the ball out of the park, but their latest efforts went foul. Compaq and Dell, on the other hand, served up better notebooks at comparable prices, and that's the combination we think most users would prefer. ▼

ZDNet Price It!™	code
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Dell Latitude LS H400ST	33838
HP OmniBook 900	33839
IBM ThinkPad 570E 6AU	33840
Toshiba Portégé 3440CT	33841

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< PRODUCT SUMMARY >

RATED 1 TO 5 STARS	★★★★ Best Buy	★★★★	★★★	★★★	★★★
SYSTEM	Compaq Armada M300	Dell Latitude LS H400ST	HP OmniBook 900	IBM ThinkPad 570E 6AU	Toshiba Portégé 3440CT
COMPANY	Compaq Computer Corp. Houston, TX 800-888-9909 www.compaq.com	Dell Computer Corp. Round Rock, TX 800-388-8542 www.dell.com	Hewlett-Packard Co. Palo Alto, CA 800-322-4772 www.hp.com	IBM Research Triangle Park, NC 800-426-7255 www.ibm.com/pc/us	Toshiba America Information Systems Irvine, CA 800-867-4422 www.toshiba.com
BASE PRICE (MFR. EST.)	$2,899	$2,402 (direct)	$1,999	$3,094	$2,199
PRICE AS TESTED	$3,398	$2,501 (direct)	$2,254	$3,338	$2,977

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FLATBED SCANNERS

Scanning
for Savings

With prices hovering around the $100 mark, these five flatbed scanners cut costs but not corners.

by **Bill Dyszel**

These days, you can pick up a decent scanner for about as much as you'd spend on dinner for two at a moderately priced restaurant. In addition to being easily available, most new scanners are even easier to use. Good thing, too, since people are using them for just about everything— from sharing photos with friends and family to archiving personal documents.

ScanJet 3400C

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< FACT FILE >

Category Tested	Low-Cost Flatbed Scanners
Price Range	$89.99 to $129
Minimum Configuration	Flatbed scanner with 600x1,200-dpi true optical resolution, USB interface, CCD sensor
Companies Included	Acer Peripherals America, Hewlett-Packard Co., Microtek Lab, Umax Technologies, Visioneer
Best Buy October 2000	**Umax Astra 3400:** Fast scan speeds, accurate color reproduction and OCR performance, and a sub-$100 price tag make the Astra 3400 a standout among budget scanners.

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This newfound ease of use is scanner manufacturers' response to consumer demands for hassle-free setups and a way to avoid selecting from a range of options each time they scan. As a result, the current crop of scanners require no more operating skill than the ability to push a button.

We looked at five major-brand flatbed scanners priced at less than $130. Now that USB is a standard feature on new computers, we decided to limit our tests to scanners that use USB rather than the older parallel-port connection. USB provides superior speed, vastly simplifies the installation process, and eliminates the possibility of problems caused by parallel-port resource conflicts. The five units reviewed here let you easily execute the most popular scanner functions and are equipped with buttons that provide one-touch access to e-mail, optical character recognition (OCR), or simple photo scanning. Although the time it took us to scan a single document ranged from about 30 seconds to 2 minutes, we found all of these scanners to be reasonably easy to set up and use.

All of the scanners reviewed here acquire images using charge-coupled device (CCD) technology rather than contact image sensor (CIS) technology. Overall, CCDs are more sensitive to light

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and render clearer images.

It should also be noted that these five scanners are targeted squarely at the entry-level consumer. If you want a scanner for professional use, these same manufacturers offer a range of products with more sophisticated features at higher prices. But for around a hundred bucks, any of these units will fill the bill quite nicely for home users.

ACER 640BU ★★★
PROS: Top-quality color reproduction; superior OCR performance
CONS: Tricky installation; confusing function keys; lack of confirmation for some functions

Although the Acer 640BU had the best OCR performance of the group, it's not the most consumer-friendly unit we've run across. Installation of the $97.99-estimated scanner required quite a bit of tooling around with drivers, and the software installation demanded a bit of detective work as well. Two or three years ago, we would have expected to wrestle with this type of installation program, but all of the other entries in our roundup found ways to simplify the installation and operation of their products.

Once you've figured out how to use the utility programs that come with the Acer 640BU, you'll have even more control over

How We Tested

All five scanners were tested on a 266MHz Pentium II Gateway system equipped with 96MB of RAM under Windows 98 Second Edition. We used the system's built-in USB port to connect each of the scanners. Each scanner was tested on a freshly rewritten image of the system's hard drive, containing only the drivers for the scanner being tested. Our test printer was an Epson Stylus Photo 870.

In our Timed Image Acquisition test, we scanned a standard Kodak photo three times; the results were averaged to see how quickly each product could process an image using the standard consumer settings. We then scanned samples of single- and three-column text to measure the accuracy of the bundled OCR packages. For the final test, we scanned the test photo at each scanner's highest available resolution and printed the file using Adobe Photoshop. We then submitted the unidentified results to a three-member jury, which judged the quality and accuracy of each image. ▼

functions like color depth, gamma correction, and other details that may be important to graphics professionals (but not so significant for home users). Another slightly confusing but useful detail is the way each

< FEATURE COMPARISON >

	Acer 640BU	HP ScanJet 3400C	Microtek ScanMaker 3700	Umax Astra 3400	Visioneer 6200 USB
MFR. EST. PRICE	$97.99	$129	$119.99 (list)	$99	$89.99
PHYSICAL CHARACTERISTICS					
Maximum Scan Area (Inches)	8.5x11	8.5x11.7	8.5x11.7	8.5x11.7	8.5x11.7
Maximum Color Depth (Bits)	42	42	42	42	42
One-Touch Scanning	Yes	Yes	Yes	Yes	Yes
Chassis Dimensions (HWD, Inches)	3.5x12x19	3.7x12x19.5	4.6x11.4x20	2.6x11.6x18.2	3.7x10.5x16.7
Parallel-Port Interface	No	Yes	No	No	No
Automatic Document Feeder	No	No	No	No	Optional
Transparency Adapter	No	No	Yes	No	No
OPERATIONAL FEATURES					
600x1,200-dpi True Optical Resolution	Yes	Yes	Yes	Yes	Yes
Zoom	Yes	Yes	Yes	Yes	No
Batch Scan	Yes	No	Yes	Yes	No
Rotate	Yes	Yes	Yes	Yes	No
Blur	Yes	Yes	Yes	No	No
Sharpen	Yes	Yes	Yes	Yes	No
Edge-Enhancement Feature	Yes	No	Yes	Yes	No
BUNDLED SOFTWARE					
TWAIN Driver	MiraScan	HP	Microtek ScanWizard 5.10	Umax VistaScan	Visioneer Scan Manager 262
Image-Editing Software	Kai Photo Soap 2, Ulead Photo Express 3	Adobe ActiveShare	Adobe PhotoDeluxe	Adobe PhotoDeluxe	MGI PhotoSuite II SE
OCR Software	ABBYY FineReader	HP PrecisionScan LTX	OmniPage LE	OmniPage LE	TextBridge Pro 8
Document-Management Software	Presto PageManager Deluxe	None	PageKeeper	Presto PageManager	PaperPort Deluxe
Other Applications	PhotoGenetics	ArcSoft PhotoFantasy, ArcSoft PhotoMontage, ScanJet Copy Utility, Trellix Web	Adobe Acrobat Reader, Kodak Digital Science Color Management, Trellix Web Microtek Edition, Ulead PhotoImpact	NewSoft PageType, Umax VistaShuttle	PictureWorks PhotoEnhancer, WebPublisher Link
SERVICE AND SUPPORT					
Standard Warranty (Parts and Labor)	One year	90 days	One year	One year	One year
Toll-Free Technical Support	Yes	No	No	No	No
Technical-Support Hours	24 hours daily	6 a.m. to 6 p.m. M-F (MT)	7 a.m. to 7 p.m. M-F, 10 a.m. to 5 p.m. Sa-Su (PT)	7 a.m. to 9 p.m. M-F, 9 a.m. to 6 p.m. Sa (MT)	8 a.m. to 5 p.m. M-F (PT)
Online Technical Support	E-mail, Web	E-mail, Web	E-mail, Web	E-mail, Web	E-mail, Web

Best Buy (Umax Astra 3400)

of the scanner's three operating buttons can handle two different functions; one function launches when you press the button quickly, and the other launches when you hold the button down for two seconds.

Oddly, some functions, such as OCR, execute in a background process on your PC, without providing any indication that they actually worked.

Nevertheless, Acer was our hands-down winner for OCR accuracy. Even our fiendish three-column OCR test page emerged almost flawlessly from ABBYY FineReader, the OCR program bundled with the unit. This task utterly flummoxed three of the four other scanners we tested. The 640BU was also among the best performers in rendering our sample color photos, with good skin tones and even color across the spectrum.

Although the Acer 640BU has its problems, you may be able to overlook them in view of its low price and good performance.

HP SCANJET 3400C ★★★★
PROS: Dual USB and parallel-port interfaces; stylish blue case; easy-to-use controls; excellent color-photo scanning
CONS: Difficulty with three-column OCR test

Hewlett-Packard combines the best of the old and new with the HP ScanJet 3400C by including both parallel and USB connections. This makes for a simple connectivity

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choice for users who don't know if their computer supports USB, as well as for owners of older systems that probably only have a parallel-port connection. The three operating buttons on the scanner's case are set up to launch scanning, copying, and e-mail programs without requiring you to use the desktop computer.

The HP PrecisionScan software that came with the ScanJet did a respectable job with our one-column OCR test page, but it converted our entire three-column test

page into a graphic. The ScanJet excelled on our color-photo scanning tests, however. In fact, the unit's reproduction abilities were among the best of all the units reviewed here, with rich hues and subtle differences in contrast clearly displayed. The scanner automatically distinguishes color items from black and white, and adjusts them accordingly.

The ScanJet's translucent blue cover also makes for a welcome fashion statement, though Martha Stewart would probably frown on the choice of blue as the only color available. Still, HP was the only vendor of the five to realize that many consumers choose a product just because they like the color.

With an estimated price of $129, the HP ScanJet 3400C is the most expensive unit included here. It may not be the best all-round performer for the price, but it boasts an excellent design and can be used with both older and newer systems.

< C O M P U T E R S H O P P E R B E N C H M A R K S >					
ZD — LOWER SCORES ARE BETTER	Acer 640BU	HP ScanJet 3400C	Microtek ScanMaker 3700	Umax Astra 3400	Visioneer 6200 USB
TIMED IMAGE ACQUISITION TEST 300x300 dpi					
Time to Prescan (Minutes:Seconds)	00:11.27	00:19.50	01:48.51	NA*	00:23.11
Time to Scan (Minutes:Seconds)	00:40.58	01:26.84	01:56.26	00:26.21	00:54.96
OCR TEST					
Single Column (Number of Errors)	1	26	3	3	29
* = Not applicable—one-step scan, no prescan shown					

Acer 640BU and HP ScanJet 3400C

Scan Samples

Acer 640BU HP ScanJet 3400C Microtek ScanMaker 3700 Umax Astra 3400 Visioneer 6200 USB

MICROTEK SCANMAKER 3700 ★★★★
PROS: Includes slide attachment; dual-platform support (Windows and Mac)
CONS: Cumbersome software installation

Although it's one of the higher-priced units here, the $119.99-list Microtek ScanMaker 3700 is the only one that includes an attachment for scanning slides and filmstrips. Slide scanning is a task that appeals to graphics professionals more than the average consumer, and the same could be said for the ScanMaker 3700 itself.

Microtek has apparently attempted to offer something for everyone in its design of the ScanMaker, which includes both a simplified preset-style interface for the scanning software, as well as a group of advanced settings. The scanner and its software are also designed to work with both Windows and Macintosh systems (Windows 98 or later, and Mac OS 8.6 or later).

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The three buttons on the ScanMaker's case are identified by icons, not text, which can leave you guessing as to each button's function. The buttons are programmable with one of the software utilities bundled with the scanner. This provides a great amount of flexibility. You can direct the output of a scanning job to any program installed on your desktop computer with the touch of a single button—provided, of course, that you remember which button is which.

Installing the ScanMaker 3700 isn't difficult, but the software installation isn't totally seamless. The CD that comes with the unit includes 10 software packages, and you have to install each of them separately. Unfortunately, you won't find an option to install everything at once. That's not a serious obstacle for even a modestly experienced user, but a neophyte might require a bit of help during the installation process.

UMAX ASTRA 3400 ★★★★★
PROS: Outstanding ease of use; excellent OCR performance; fast scanning speed
CONS: None

The $99-estimated Umax Astra 3400 was the fastest and best-balanced scanner of the group. The Astra 3400 features four case-mounted operating buttons, which are conveniently labeled in English for the icon-impaired. Three of the buttons are dedicated to specific functions: launching your e-mail program, scanning to file, and powering on and off. The fourth is a user-programmable button that lets you quickly perform a single task of your choice.

The bundled ScanSoft OmniPage LE OCR software generated an excellent

10 Tips for Savvy Scanning

Most new flatbed scanners are so easy to use, you could probably operate one with the touch of a single button. But while the scanning process may not be all that challenging, there are some basic rules you can follow to maximize your scanner's potential.

1 WEB WARNINGS
If you're scanning pictures of the kids to post on the Internet for Grandma to see, remember that you only need a 72-dpi resolution for this particular task. That's far below the 1,200-dpi resolution that all of the scanners in our roundup can deliver.

2 CLEAN UP YOUR IMAGES
All of the scanners reviewed here ship with scaled-down image-editing software for touching up scanned photos. If you want the broadest range of creative tools for altering your scanned images, however, consider upgrading to the full versions of these packages. Adobe Photoshop, one of the most advanced image-editing programs, sells for about $600—although less expensive choices are available.

3 BUILD CHARACTER
If you want to use a scanner to help reduce your typing load, take advantage of the OCR package that comes with your unit. (In most cases, it's the "light" version of ScanSoft—formerly Caere—OmniPage, one of

the most popular OCR programs on the market.) But when you start scanning large volumes of documents, you may want to upgrade to OmniPage Pro, which costs about $100, or another full-featured OCR package.

4 MANAGE THOSE DOCUMENTS
Archiving documents is a specialty unto itself, and the document-management programs included with most scanners can help you store and find your files quickly and safely. Each package tends to have a specialty, either the ability to save an unusually large number of files, maximum security, or powerful search functions. Familiar names in the document-management business include Pagis Pro, PaperPort, and TextBridge.

5 DON'T GET IN TOO DEEP
Some scanners let you adjust the number of colors that the unit can detect, also known as the color depth. Increasing the color depth usually yields truer, richer colors; of course, this also means it takes a lot longer to finish the scan. If you just want to scan material faster, set the color depth to a lower setting.

6 KEEP SMALL RESOLUTIONS
Although all of the scanners we tested yield resolutions up to 600x1,200 dpi, you may not need that level of quality for everything you scan. Pictures scanned at very high resolutions yield very large files. (Our test photo was scanned at the top resolution supported by

each scanner, and the resulting files each took up nearly 100MB of disk space.)

7 WHAT'S IN THE MAIL?
When e-mailing images, remember to keep the resolution low to expedite the sending process.

8 DON'T SKIMP ON DISK SPACE
Even if you're conservative with resolutions and color depths, you can use up a lot of disk space if you get trigger-happy with the scanner button. If you don't have at least 2GB of available disk space, consider getting a bigger hard drive or a Zip drive for storing all those masterpieces.

9 SOMEDAY YOUR PRINTS WILL COME
Most of the scanners here were designed to scan images or text from paper rather than slides or other transparent materials. (The Microtek ScanMaker 3700 includes a special attachment for scanning slides.) If you plan to scan only slides, you would do well to shop specifically for a slide scanner.

10 TELL IT TO THE CAMERA
If posting family pictures to the Web is all you're after, you may want to consider getting a digital camera instead. Though you may have to spend more for a digital camera, it will easily meet your quality requirements and can make it easier to post your prize portrait on the Web. ▼

The Scholarly Scanner

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For less than $100, you'd be hard-pressed to find a better budget scanner.

VISIONEER 6200 USB ★★★

PROS: Least expensive; impressive ease of use
CONS: Inferior OCR performance and color reproduction

O f the five scanners we looked at, Visioneer's 6200 USB scanner took top honors for ease of use. You don't even need to figure out which button to press—there's only one button on the unit.

When you put a document on the glass and press the button, a thumbnail version of your document appears on your PC in the main screen of the PaperPort Deluxe

other four units we tested. Colors weren't rendered quite as accurately as with the other scanners, and the OCR performance was fairly weak as well.

At $89.99 estimated, the Visioneer 6200 USB also has the lowest price tag of the

ZDNet Price It!™	code
Acer 640BU	33849
HP ScanJet 3400C	33850
Microtek ScanMaker 3700	33851
Umax Astra 3400	33852
Visioneer 6200 USB	33853
For real-time pricing, go to *priceit.zdnet.com* and enter number.	

group. It's a suitable choice for users on a tight budget or for those who have only an occasional need for a scanner.

rendition of our one-column OCR test and a surprisingly accurate interpretation of our three-column test. The three-column test results were especially impressive in that the unit was able to distinguish between text and graphic elements and interpret each type correctly for placement in the resulting document. Only the Umax and Acer units rendered the three-column OCR test correctly. The Umax Astra 3400 also turned in the fastest scanning times in our roundup, averaging less than 27 seconds per scanned image, compared with the group average of 1 minute and 14 seconds.

For those users who want no-fuss scanning, the Umax Astra 3400 automatically detects whether your document is color or monochrome and makes the appropriate adjustments to its scan settings. It also crops the image if you're scanning an item that's smaller than 8.5x11 inches, and it automatically rotates skewed images. Presto PageManager is also included for filing scanned documents into folders.

Microtek ScanMaker 3700, Umax Astra 3400, and Visioneer 6200 USB

application. You can then drag the thumbnail over to an icon that represents what you want to do with the image. You can drag items to file folders for storage, or to the Microsoft Word icon to launch the TextBridge Pro OCR software, which converts your document into a Word file.

But you'll see a trade-off for this operational ease. The Visioneer's overall scanning quality was slightly below that of the

READY, SET, SCAN

F or this amount of money, you really can't go wrong with any of these scanners. All offer relatively straightforward operation and good overall performance.

That said, we feel the Umax Astra 3400 had a slight edge over the competition given its significantly quicker scanning speed and its ability to handle the full spectrum of scanning chores. The Astra 3400 also scores high marks for its elegant design and outstanding ease of use. For shoppers looking to get the most for their money, this is the scanner to buy. ▼

< PRODUCT SUMMARY >

RATED 1 TO 5 STARS	★★★	★★★★	★★★★	★★★★★ Best Buy	★★★
PRODUCT	Acer 640BU	HP ScanJet 3400C	Microtek ScanMaker 3700	Umax Astra 3400	Visioneer 6200 USB
COMPANY	Acer Peripherals America San Jose, CA 800-733-2237 *www.acerperipherals.com*	Hewlett-Packard Co. Palo Alto, CA 800-722-6538 *www.hp.com*	Microtek Lab Redondo Beach, CA 800-654-4160 *www.mteklab.com*	Umax Technologies Fremont, CA 800-562-0311 *www.umax.com*	Visioneer Pleasanton, CA 888-229-4172 *www.visioneer.com*
MFR. EST. PRICE	$97.99	$129	$119.99 (list)	$99	$89.99

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- 3-Yr Ltd. Warranty²; 1-Yr NBD On-site Service³

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SHOPPER'S GUIDE TO DESKTOPS

Picking *the* Perfect PC
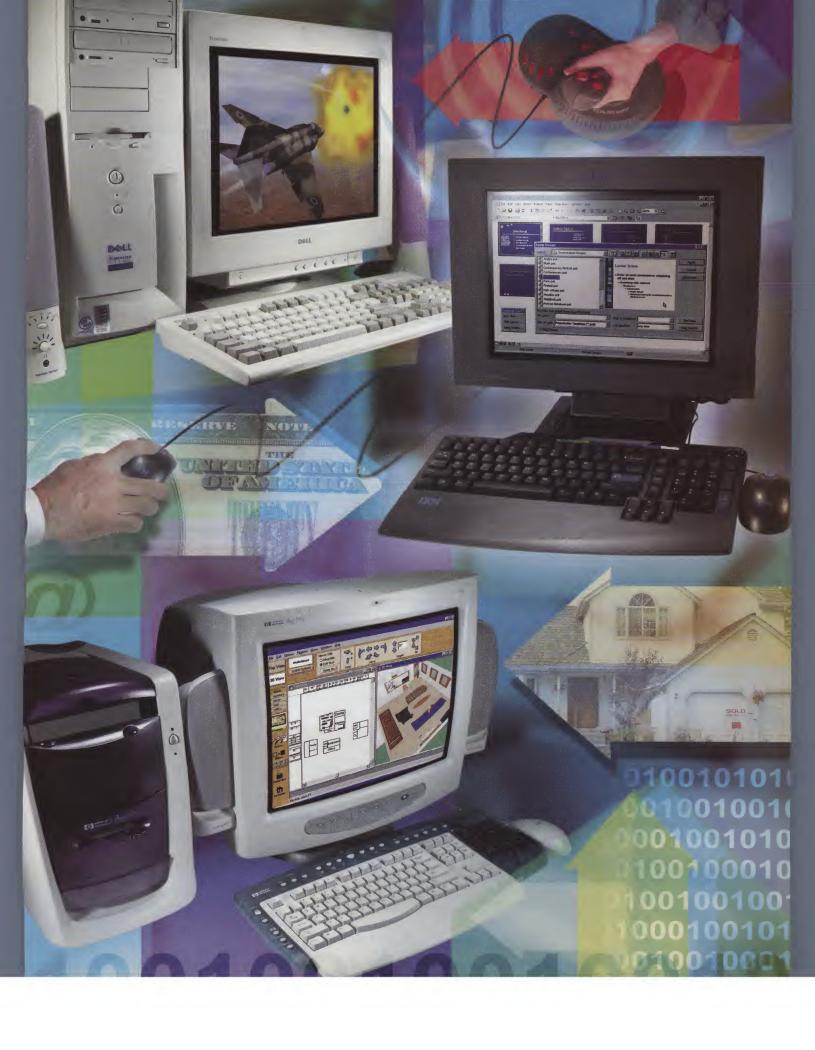
BY DAVID ENGLISH

Desktop PC performance is skyrocketing while competition among chip makers and system manufacturers is keeping prices down. With Intel and AMD releasing a spate of new chips, cache and RAM stores increasing, graphics vendors bringing new, revved-for-realism 3D boards to market, and 19-inch monitors and 40GB-plus hard drives proliferating, buyers can reap huge rewards. Indeed, this is a superb time to buy a desktop, whether you're shopping at the high end, in the bargain bin, or somewhere in between.

What do you really need in a system today, and what's an extravagance? That depends on how you'll use the PC. For example, if all you want to do is send e-mail, do some word processing, and occasionally browse the Web, just about any new model will do. Browsing the Web more frequently (especially graphics-heavy sites), playing arcade games, and exploring multimedia-rich CD-ROM titles up the ante, calling for a midrange processor, a more robust graphics adapter, and a good-size hard drive. Delve into large databases, leading-edge games, and processor-intensive tasks such as speech recognition, and you qualify for a high-end desktop.

Add just the right blend of other components to that base—such as an appropriate-size monitor, a DVD-ROM drive, a CD-RW drive, and a network card—and you can tailor a system for your particular needs. Self-configuring a system so that you get a snug fit is a good way to maximize every dollar you spend. To do so, you need to get ready for the myriad component choices you'll face. This Shopper's Guide will help.

Falling prices and a smorgasbord of choices make now the time to buy.

Purchaser Profile

⟡ Novice

Typical question
"Who can I call if something breaks?"

Motto
"Keep it simple."

Special needs
Connecting wires should be color-coded.

Key features
Easy Internet connection; plug-and-play peripherals; strong warranty with onsite service; toll-free support that doesn't put you on hold for hours

Least important amenities
Extra bays and expansion slots; advanced components (such CD-RW drives and tape backup drives), unless they come with easy-to-follow software

Likely price range
$600 to $1,800

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FAST, FASTER, FASTEST

A parade of processors makes this fall a particularly good time to desktop-shop. Intel and AMD are introducing three new families of processors during the second half of the year, providing buyers with a remarkable selection.

Unless you're buying a high-end server or workstation, you can ignore Intel's new Itanium processor (code-named Merced). Current 32-bit software titles have to be recompiled to run natively on this 64-bit chip—otherwise, they run in a slower emulation mode. This chip will also be very expensive initially and won't work its way down to ordinary desktops anytime soon.

Intel's new Pentium 4 (code-named Willamette) is slated to debut at 1.4GHz or slightly faster. Key features include a new pipeline design that speeds up instructions; a new set of 144 SIMD extensions that can accelerate video, encryption, and next-generation Internet applications; and support for the new 400MHz system bus, which runs three times faster than the fastest system bus (133MHz) offered with the Pentium III.

The Pentium 4 is tuned for higher clock speeds than the Pentium III, but while it can run at breathtakingly fast speeds, it's

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expected to provide slightly less performance per megahertz than the Pentium III. Therefore, don't assume that a 1.4GHz Pentium 4 has a clock speed that's 40 percent faster than that of a 1GHz Pentium III. The actual percentage may be lower because the Pentium 4 is being tweaked for the fastest possible clock speed, even if it means that performance degrades slightly per megahertz.

Look for the Pentium 4 quickly to take its place at the high end of the consumer and corporate desktop realms. This will push the 1.1GHz and 1GHz Pentium III processors into more affordable performance desktops and the Pentium IIIs running at 733MHz to 900MHz into the mainstream.

Intel's Celeron will continue as the company's value processor. A good rule of thumb is to assume that a Celeron is roughly one clock speed slower than an equivalent Pentium III processor. For example, a 700MHz Celeron runs about as fast as a 650MHz Pentium III. Celeron chips use the 66MHz system bus, as opposed to the Pentium III's 100MHz and 133MHz buses (although 100MHz-bus-speed Celerons are planned for the future). In addition, the Celeron's L2 cache is set at 128K, compared with 256K and 512K for the Pentium III.

Because the Celeron lags the Pentium III by only one clock speed, it can be an especially good bargain. PC makers tend to place less-powerful components in their Celeron models to create the impression that there's a substantial difference between the two chip families. A good strategy for middle-tier buyers is to purchase a Celeron system and beef up the other components, rather than pay a premium for a Pentium III and have to cut back on the components. This way, you can purchase either a comparable system for less money or a much better equipped system (component-wise) for the same amount of money.

AMD has become extremely competitive

Fully loaded: This Dell Dimension XPS B1000r packs a 19-inch monitor and a three-speaker Harman Kardon sound system.

with Intel over the past few years—and not just on the low end. AMD's Athlon family of processors has successfully gone head to head with the Pentium III, both in megahertz designations and overall performance. The fastest Athlon chip (code-named Thunderbird) uses copper wiring, which is a more efficient conduit for electricity. The Thunderbird has a 256K L1 cache on the chip itself; slower Athlons have a 512K L2 cache off-chip. The 256K L1 cache is actually faster than the 512K L2 cache because of its proximity to the processor. The Thunderbird also has a 128K L2 cache off the chip, giving it a combined cache of 384K. The Thunderbird processors don't have a distinct family name, but are marketed as "performance-enhanced" Athlons. AMD is expected to boost the clock speed of the Athlon to 1.5GHz by January 2001, so look for incremental steps this fall. Because AMD intends to remain fully competitive with Intel, we should continue to see downward pressure on prices for performance desktops.

On the low end, AMD's new Duron processor competes directly with Intel's Celeron. The Duron is AMD's first low-cost processor based on the company's Athlon technology. It features both a 128K L1 and 64K L2 cache, and should be available in 600MHz, 650MHz, 700MHz, and 750MHz flavors. Like the Athlon, the Duron supports a 200MHz system bus. With its faster cache and system bus, the Duron is fully competitive with the Celeron. Look for the Celeron and Duron processors to dominate the sub-$1,000 desktop market.

COMPOSITION COUNTS

CPUs may take center stage in the news, but they shouldn't necessarily do so in your buying decision. For example, if you're working with 3D-rendering programs, *you're probably* better off spending $100 less on your processor and $100 more on your graphics adapter. If you're into video editing, you may want to direct your dollars toward a larger hard drive. And if you work extensively with desktop-publishing programs, it may be wise to favor a larger monitor, even if it means cutting back on the processor. Although vendors tend to match their better components with their faster processors, you can often mix and match the components yourself when buying direct, putting together a similarly impressive system with a somewhat slower processor.

Unless you're buying a sub-$1,200 system, expect the desktop to have 128MB of RAM. Most systems have SDRAM, though some higher-priced configurations

Purchaser Profile

Small-office/ home-office user

Typical question
"Can I deduct this?"

Motto
"I'll buy it if it can save me money in the long run."

Special needs
Strong vendor support

Key features
Latest office suite; built-in network card; strong three-year warranty with onsite service; option to extend warranty; reliable vendor with a good reputation

Least important amenities
Latest graphics card; top-of-the-line sound system

Likely price range
$1,000 to $2,400

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use faster RDRAM. Also known as Rambus memory, RDRAM excels at handling sequential data in multitasking environments, but it isn't dramatically faster in every situation.

Some desktops ship with 256MB of RAM, which could be useful if you work with giant multimedia files or like to run several demanding applications at a time. If you plan to keep the system for several years, be sure to ask how much memory can be added to the system. Look for a maximum of at least 256MB, though 512MB or 1GB is preferable. Memory prices tend to fall over time, so 1GB

Need a PC with a compact design? Models like IBM's NetVista, with its sleek, legacy-free design, fit nicely.

SHOPPER'S GUIDE TO DESKTOPS

of RAM may be relatively inexpensive in two or three years. Also, be sure to ask how the memory has to be configured to reach the maximum. Some systems require you to take out existing modules to max out your system's memory with a RAM upgrade.

Given the ever-increasing use of large multimedia files in all aspects of computing, you cannot have too much hard drive space. Years ago, a 3GB drive seemed impossibly large, but today's seemingly mammoth 45GB drive may appear equally small four years from now. Even if your needs are relatively modest, consider buying a 20GB or larger drive. You'll find ways to fill it, and it's less expensive to add hard drive space now than it will be to add another drive later on.

Today's graphics adapters are so powerful—and so essential for the latest 3D programs—that they've surpassed CPUs in importance when it comes to moving pixels across the screen. If 3D games and 3D-rendering programs are regulars on your desktop, opt for a system with one of the fastest graphics processors: nVidia's GeForce2 GTS, GeForce2 MX, or GeForce; 3dfx's Voodoo 5500 or 6000; ATI's Radeon 256; or Matrox's Millennium G450.

These days, virtually every desktop has some form of 3D acceleration. The barest minimum you'll see today are PCs that don't have a graphics card at all but instead tap into the graphics routines included in Intel's 810, 810e, 815, 820, or 850 chip sets. If 3D graphics are vital to your work—or play—steer clear of a system that offers only this minimal amount of 3D support.

Falling prices have helped 17-inch monitors replace 15-inch monitors as the desktop standard. You can find 19-inch models for less than $500, so if you need to view your desktop comfortably at 1,280x1,024 or 1,600x1,200 resolution, consider stepping up to a 19-inch display. If you're buying a monitor with your system, you may be able to bundle in a 19-inch model for only $100 to $200 more than a 17-inch one. If your desk is too small to support a 19-inch—or even a 17-inch—monitor, look for units with a short-neck design; they don't stick out as far in the back. A 19-inch short-neck monitor is shorter than a typical 17-inch

monitor, just as a 17-inch short-neck monitor is shorter than a typical 15-inch monitor.

Flat-face monitors have a more uniform focus and reflect less glare, so they're preferable to those with a curved picture tube. And some monitors have powered USB ports so you can plug in USB peripherals such as mice, scanners, keyboards, and joysticks. For your convenience, some monitors use the USB connection to the PC to let you control the color and geometric settings from the Windows desktop. And if you place the benefits of integration (saved space, for instance) above sound quality and the ability to upgrade, you might prefer a model with built-in speakers and microphone.

Prices on flat-panel monitors (also known as LCD monitors) fell sharply in 1998, rose again in 1999, and have fallen again in 2000.

Purchaser Profile
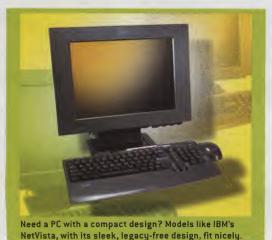
Gamer

Typical question
"If I overclock the processor, will it improve the frame rate for Quake III?"

Motto
"Too much is not enough!"

Special needs
Easy access to the inside of the case

Key features
Latest graphics card; fastest processor; largest hard drive; top-of-the-line sound system

Least important amenities
Software bundles that consist only of productivity programs

Likely price range
$1,500 to $3,000

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www.zdnet.com/downloads

Their advantages include a sharp and even focus, compact size, light weight, and essentially no electrical emissions. Their disadvantages include higher prices, difficulty in displaying resolutions other than the native resolution, and a slower response time (which can show up as a slight ghosting). The technical disadvantages are slowly disappearing with each new product generation, but you still have to pay a significant premium for these futuristic-looking monitors. If you choose an LCD, be sure it has a DVI input as well as a standard VGA input. *DVI is set to become the* connector of choice for digital monitors and digital-compatible graphics adapters.

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T20-81U	Pentium III 700 14.1 TFT	128/12/DVD/56k		3499.99
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1320	Celeron 550	12.1 HPA	64/6/24X/56k	1499.99
1340	Celeron 550	12.1 TFT	64/6/24X/56k	1699.99
1370	Celeron 550	13.3 TFT	64/12/24X/56k	1999.99
1482	Celeron 550	14.1 TFT	64/6.4/DVD/56k	1799.99
1492	Pentium III 500	14.1 TFT	64/6.4/DVD/56k	2399.99

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Pentium III 450 Mhz Processor
13.3" Active Color Display,
64 Mb Ram/6.4Gb HD,
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$2299.99

Model	Processor	Display	Ram/HD/CD/Mod	Price
600X	Pentium III 500	13.3 TFT	64/12/DVD/56k	2599.99
600X	Pentium III 500	13.3 TFT	64/12/DVD/56k	2799.99
600X	Pentium III 650	13.3 TFT	64/12/DVD/56k	2999.99
600X	Pentium III 650	13.3 TFT	64/12/DVD/56k	CALL

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XE2	Pentium III 500	12.1 TFT	64/5/24X/56k	1599.99
XE2	Celeron 550	14.1 TFT	64/5/DVD/56k	1899.99
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6000	Pentium III 600	14.1 TFT	128/10/24X/56k	3299.99
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C6535	Pentium III 500	14.1 TFT	128/12/6XDVD/56k	1899.99
C6547	Pentium III 600	14.1 TFT	64/12/DVD/56k	1999.99
C6556	Pentium III 600	14.1 TFT	64/15/DVD/56k	2299.99
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524 TXV	Pentium III 650	14.1 TFT	64/6/DVD/56k	CALL
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734 TXV	Pentium III 650	14.1 TFT	64/9/DVD/56k	2499.99
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- MPEG Mode
- USB Connection
$869.99

OLYMPUS D-490 Zoom
- 2.11 Mega Pixel CCD
- 3X Optical/2X Digital Zoom
New

Kodak DC-4800
- 3.1 Mega Pixel CCD
- 3X Optical/2X Digital Zoom
- Selectable ISO Settings
$689.99

SONY Mavica MVC FD 90
- 1.6 Mega Pixel
- 8X Optical Zoom
- MPEG Mode
- Removeable
- 3.5 Floppy
$669.99

Nikon Coolpix 950
- 2.11 Million Pixels
- 3X Zoom
- Macro Mode
$599.99 After Rebate

OLYMPUS D-360L
- 1.3 Mega Pixel
- 8 Mb Card
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OLYMPUS C-3030
- 3.34 Million Pixels
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SONY Mavica MVC FD 85
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Canon Powershot S-100
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Olympus C-3000	649.99	Sony MVC-D1000	New
Olympus C-2500L	In Stock	Sony MVC-FD73	399.99
Olympus C-2020	599.99	Nikon Coolpix 800	449.99
Olympus C-2000	549.99	Panasonic PVDC-2090	New
Olympus D-460Z	339.99	Panasonic PVDC-2590	New
Sony DSC-S70	689.99	Panasonic PVDC-4090	New
Sony DSC-S50	519.99	Canon Powershot 70	649.99
Sony DSC-S30	419.99	Canon Powershot S20	629.99
Sony DSC-F505V	829.99	Canon Powershot S10	389.99

Canon Canoscan 2710F	499.99		
Minolta Dimage 2300	New		
Fuji Fine Pix 4700	649.99		
Fuji MX-2700	559.99		
Fuji MX-2900	639.99		
Kodak DC-200 Plus	CALL		
Kodak DC-280	479.99		
Kodak DC-S30	569.99		
Kodak DC-215 Millenium	CALL		

STORAGE, SIGHTS, AND SOUNDS

Shop for a desktop today, and you'll encounter a variety of drive configurations. Most manufacturers now include CD-RW drives instead of CD-R drives, and some systems now include both a DVD-ROM and a CD-RW drive. If there's a single optical disc

Living color: Hewlett-Packard's Pavilion 9790C offers interchangeable color inserts, adding pizzazz to your desktop.

drive on board, it's likely to be a CD-RW, which is beginning to replace the Zip drive as the standard removable-storage drive (apart from the floppy).

If your desktop's going to be part of one of the growing number of networked small businesses or broadband-equipped homes, you can probably get by with just one tape backup drive on just one of your network-connected desktops. As with corporate networks, you can do network-wide backups to a single drive. Each individual desktop can use its CD-RW or Zip drive for incremental backups and for copying moderately sized files to systems off the network.

You still won't find many DVD-ROM software titles, but the number of people watching DVD movies on their PCs is growing. Many of the latest high-end graphics cards are fully capable of decoding MPEG-2 video, and today's faster processors are powerful enough to support software-based MPEG-2 decoders. For a slower system without one of the latest graphics cards, you may need a dedicated MPEG-2 decoder card. Without it, DVD playback will be jerky at times.

If MP3 files and DVD movies are important to you, by all means spend a little extra and get a quality sound card and audio system. Companies like Creative Labs and Turtle Beach have excellent sound cards that can add expansive 3D sound to your games, system sounds, music, and movies. For an even more satisfying audio experience, consider at least a three-piece speaker system. These systems have two satellite speakers and a separate sub-woofer for richer bass tones. You can find

SHOPPER'S GUIDE TO DESKTOPS

three-piece speaker systems that provide five discrete channels of audio. Some of these systems can decode Dolby Digital, as can many of the five-piece speaker systems out there.

THE FINAL SAY

Core components aside, you'll need to consider several other features as you shop. Some are designed to support or enhance a specific task. These include an IEEE 1394, or FireWire, port, which you can use to send video to and from a digital camcorder; a network card, which is often used to share a printer or broadband connection; and an enhanced keyboard, which may have dedicated keys for Internet access or controls for adjusting the playback of music and movies. For example, with Gateway's Performance 933xl, you can add an IEEE 1394 card, choose among nine different networking options, and select from three different keyboards.

Ergonomics and aesthetics matter, too. This season, the shape, size, and color of your computer are also points of comparison.

Purchaser Profile
Family

Typical question
"How much abuse can this thing really take?"

Motto
"We'll have to share."

Special needs
Sturdy construction

Key features
Diverse software bundle (office suite, encyclopedia, finance program, and so on); strong three-year warranty with onsite service

Least important amenities
Network card (unless considering broadband Net access or sharing a printer)

Likely price range
$600 to $2,600

Favorite ZDNet download
Ancestral Quest 3.0.10
Research your family tree.
www.zdnet.com/downloads

Purchaser Profile
Student

Typical question
"How many MP3 files can I fit on the hard drive?"

Motto
"Pound it till it breaks!"

Special needs
Has to fit on a dorm-room desk

Key features
CD-RW drive; DVD drive; latest graphics card; top-of-the-line sound system; bundled word processor and encyclopedia

Least important amenities
Software bundles that consist only of productivity programs; warranty (let Mom and Dad worry about that)

Likely price range
$800 to $2,000

Favorite ZDNet download
CuteMX
Download and share files on the Net.
www.zdnet.com/downloads

If you choose a space-saving compact model or a minitower PC, you may limit your expansion options. For example, IBM's svelte NetVista X40 integrates its PC components into the narrow base of its LCD monitor. It has no expansion slots, drive bays, serial port, or parallel port; your peripherals connect to its USB ports. Such a system can be a fair trade-off—just be aware of what you're giving up. And regardless of the shape or size you choose, you don't need to settle for beige. For example, Sony VAIO desktops come in steel gray and metallic blue; Hewlett-Packard lets you personalize its HP Pavilion home PCs with inserts available in cobalt blue, krypton green, and xenon purple.

Be sure to scrutinize the vendor's warranty and support information. If you're unhappy with your system or if it's not performing up to par, you need to know that you can return it without a penalty (such as a restocking fee) or that repairs will be covered for the first one to three years. Also, ask who picks up the shipping costs if repairs are needed.

With the number of PC choices at an all-time high, it's wise to spend some time exploring your options. Don't shy away from swapping out a component for a more—or less—powerful version. Buying in today's market lets you fine-tune a system to your needs and budget with accuracy—if you take full advantage of the palette of parts and processors before you. ▼

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10.0 GB (7200 rpm) UltraDMA Hard Drive[1]
16X DVD-ROM Drive[5]
8X CD-RW Drive[4]
2X AGP with 64-bit Hardware Accelerated 3D Graphics
56K ITU V.90 Modem[3]
ESS Allegro Integrated PCI Audio
JBL Platinum Speakers with Digital Audio Port
Compaq CV535 15" Monitor (13.8" VIA)

Personalize by choosing:
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APC Back-UPS Pro Office 280: Add $89

WEB SURFER

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40X Max CD-ROM Drive[2]
2X AGP with 64-bit Hardware Accelerated 3D Graphics
56K ITU V.90 Modem[3]
ESS Allegro Integrated PCI Audio
JBL Platinum Speakers with Digital Audio Port
Compaq CV535 15" Monitor (13.8" VIA)

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WEB SURFER

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QuickAccess Code: 37X9X5-62122

Intel Celeron Processor, 566 MHz
12.1" HPA Display
32 MB SyncDRAM
5.0 GB UltraDMA Hard Drive[1]
24X Max CD-ROM Drive[6]
Trident CyberBlade Hardware Accelerated 3D Graphics
56K ITU V.90 PCI Modem[3]
NiMH Battery
128 KB Integrated "On-chip" Cache
Microsoft Windows 98 Second Edition Installed
with Free Upgrade to Windows Millennium Edition[8]

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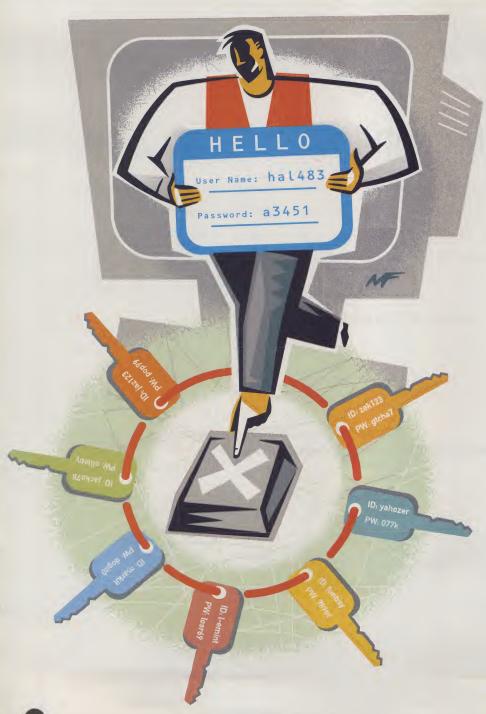
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Sign On Once, Surf Often

BY LYNN GINSBURG

These three Web services speed up surfing by streamlining logins.

When you're clipping down the Web's highways and byways, shopping and gathering information, nothing's more annoying than hitting a cyber speed bump—a login or registration form. In fact, today, when you head online, raring to page-hop, you're increasingly likely to trip over sites that demand you first enter a username and password. Adding to the aggravation is the burden of having to remember, or at least manage, all the different login names and passwords that you have accumulated.

Fortunately, a new breed of Web tools is gearing up to smooth the login process. These single-sign-on solutions, also known as digital ID services, manage your access to sites that require a user ID and password to log in. You then only need to remember your username and password for this central sign-on site.

Each of the three single-sign-on services we look at here—digitalme, Microsoft Passport, and v-Go 2.0—takes its own approach to automating the process. And while each of the three services has its strengths and weaknesses, none is completely reliable yet.

The technology used to automate the sign-on process is still new. With no universal standards yet in place for Web sign-ons and forms, getting automatically logged in to a site remains a hit-or-miss prospect. All three services are free, however, so it won't cost you a penny to let them help out where they can. If you do a lot of surfing, and

thus a lot of signing in, single-sign-on services will at least get you through the gate more quickly than before.

Surfers should note, however, that because all of these services' Web sites collect and store your personal data, privacy is a concern. Each of the three we test-drove has an explicit privacy statement. With these sites, and any others that serve as repositories for privileged information,

As you fill in a form, digitalme can record it for you and automatically fill it in the next time you visit the site.

you'll need to read the privacy statements carefully to know what promises are made regarding the use and protection of your personal data. Don't release any information without first doing so.

DIGITALME ★ ★ ★ ★
PROS: Consistent auto-login; comparatively good form filling
CONS: Fills in forms only partially; scant documentation for key features such as meCards

Novell's digitalme aims to help you create and maintain your digital identity. For the most part, the service accomplishes this mission.

The registration process for digitalme is the easiest of the group. Simply provide a username and e-mail address, pick a password, and you're signed up for the service. Before you can use the automatic-login and form-filling tools, however, you must also download the digitalme toolbar and install it in your browser.

To help you manage your digital identity and the amount of personal information you'd like to share with others, digitalme has you create meCards, forms you fill out with as much or as little personal information as you choose. You can also create alias-identity meCards to help you manage any alternate digital personalities you might have.

The auto-login process is simple to use and works well. Just select Record This Login from the digitalme toolbar, and as you enter your ID and password, the program records it. You can then select the login page

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UNIVERSAL SIGN-ON SERVICES

from the list of recorded sites the next time you want to be signed in automatically.

In theory, the form-recording tool works much the same way. The tool can record information as you fill out a form, then automatically complete it for you the next time you visit the site. Though the form tool records data faithfully, it doesn't always fill in all of the fields in a form. Having some of the data filled in is better than starting from scratch, but it's still inconvenient to have to finish a lot of half-completed forms.
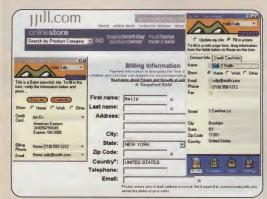
Fortunately, you can also use your meCards to fill in forms, although digitalme offers little documentation about this option. Just choose Fill in the Form from the digitalme toolbar, and the program fills out the form to the best of its ability using your active meCard profile. The meCards work better than the form-recording tool, but they, too, only partially fill out forms.

In sum, digitalme's automatic-login features are reliable and useful. The service has great promise, especially if its form-filling feature can be improved.

Clicking Into the Express Lane

Logging in is just one of the repetitive tasks that slow Netizens down. For the millions of us doing a lot of our shopping online, the drudgery of filling out form after form (including those that ask for credit-card information) at Web stores is a drag, if not a deterrent.

Digital wallets can automate this process. A somewhat blurry line separates digital wal-

You can use Gator's onscreen form filler to fill in forms using drag-and-drop, or you can use one-click fill-in at Gator merchant sites.

MICROSOFT PASSPORT ★ ★
PROS: Reliable sign-in; wallet capability
CONS: Too few sites supported to make it useful

Microsoft Passport has the biggest brand-name recognition of the three services we reviewed. But currently, Passport shows neither the depth of features nor the widespread adoption that one expects from Microsoft products.

Passport offers amenities found in the competing services, namely automatic login and a digital-wallet service that fills in both contact and credit-card information. Unfortunately, Passport only works with partner Web sites. At press time, these included only 10 sites for automatic sign-in and only 35 sites for the wallet feature. However, Microsoft expects more than 25 sign-in sites and more than 130 wallet sites to be participating soon.

To register for Passport, you provide your e-mail address, password, secret question, country, state, and ZIP code. Microsoft then sends you back an e-mail requesting verification. Once that's done, you're registered for the service.

If a site is Passport-enabled, you can automatically log in by clicking on the Passport sign-in icon. For sites that support the Passport wallet, you can speed up the checkout process as well, because the

lets from single-sign-on services. Most digital-wallet services will also log you in and fill out forms. But the best ones focus on the tasks of securely storing your credit-card information and making it easy to fill out those pesky payment forms.

Digital-wallet services such as the ones built into Microsoft Passport, AOL's Quick Checkout (*payment.aol.com*), Qpass PowerWallet (*www.qpass.com*), and CyberCash's InstaBuy (*www.instabuy.com*) only work with participating merchants. This inherently limits their usefulness.

EntryPoint's eWallet (*www.e-wallet.com*), on the other hand, can be used at any merchant site. It offers one-click drag-and-drop access for filling out forms from merchants it recognizes, but it can also fill out forms at any site, using a drag-and-drop process. To limit the likelihood that hackers will steal your credit-card information, eWallet stores this sensitive data locally, on your computer.

Another promising digital-wallet service, Gator (*www.gator.com*), offers similar amenities, with local storage of your personal data and comparable form-filling capabilities.

If you shop as often as you surf, these universally accepted e-wallets can make it easier to fork over your digital dough. ▼

service automatically fills in shipping, billing, and credit-card information.

Unfortunately, we found no indication of the Passport icon anywhere on a number of sites represented by Microsoft as wallet partners. If these partners are indeed Passport-enabled, they're certainly not going out of their way to advertise the fact and facilitate the checkout process with the service.

Although the wallet feature is simple to use, the dearth of actively participating online merchants makes its usefulness too limited, at this point, to be of consequence.

Sign in with Passport before shopping online at sites that support the service and your contact info is completed automatically.

If the service gains wider acceptance, its streamlining simplicity could be a boon to surfers and shoppers.

V-GO 2.0 ★★★

PROS: Graphical passwords; fast and intuitive pop-up login functionality; wallet capability

CONS: Form filling only works for partner merchant sites; Instant Logon doesn't work with Netscape browsers

Of the three services, Passlogix's v-Go 2.0 takes the most unusual approach to securing your digital identity. Instead of having you enter a name and password at the v-Go site for automating your login to other sites, v-Go has you create a unique graphical sequence. For instance, using v-Go's Cocktail Lounge password window, you could mix a gin and tonic as your unique graphical password. Or in the

UNIVERSAL SIGN-ON SERVICES

Hiding Valuables password window, you could hide a wallet in the top drawer of the dresser. This graphical approach offers excellent security, and it's also a lot of fun to use.

You start the registration process at v-Go by downloading the software and the graphical password window. The software's wizard then helps you set up and test your graphical password. You must also enter your full name and e-mail address, and enter five answers to unique questions, such as who your favorite teacher in high school was, that you can use for verification in case you forget your password. The program then downloads a serial number for you to use to activate the software.

You can run v-Go in the background as you surf. Whenever you open a Web page that requires a sign-in, v-Go pops up with a wizard that offers to create a configuration for logging in to that site. When you call up that page again, v-Go automatically logs you in. Unfortunately, v-Go doesn't work consistently. And its Instant Logon feature only works with Internet Explorer, a major drawback for the many people using Netscape Navigator or other browsing software.

Like Passport, v-Go's wallet service can only fill in forms at v-Go-enabled merchant sites. And while Passport has at least a few sites already signed up, v-Go had none at press time. The company promises that this will change soon.

In addition to its head-to-head features, v-Go is alone in offering password protection

v-Go's graphical passwords let you create a unique sequence, such as hiding a wallet in a dresser drawer.

for your documents and PC. And because all v-Go information, including passwords, resides on your local hard drive, a mobility wizard can copy your v-Go settings and passwords to another computer.

Like all of these services, v-Go's got some kinks to iron out before reaching its full potential. Working consistently should be its number-one goal. In the meantime, its graphical take on things brings some levity to the serious world of security.

SIGN-IN TOMORROW

While the future looks rosy for single-sign-on services, the present is more of a predawn gray for this pack of not-quite-ready-for-prime-timers. Even so, if you're a heavy-duty surfer, some help in this department may be better than none. Having a form automatically filled in three-quarters of the way is better than confronting a blank one. The same goes for getting instant login at 50 percent of the sites that you visit. It's better than nothing, especially since it's free.

Of the three, Passport is the least helpful. The paucity of Passport sign-in sites, coupled with the fact that so few merchant sites are participating, makes it almost a waste of time at this juncture. Graphical passwords and truly automated pop-up login software earn solid marks for v-Go. However, until you can consistently count on it to log you in to every site, you're bound to be dissatisfied. Your best chance of maintaining warp speed as you navigate the Web's growing number of sign-on sites is digitalme. This service doesn't consistently complete forms, but it does a relatively good job and can definitely speed up the task.

Of course, if you're intolerant of imperfection, check back in a few months to see how these works in progress have improved. All three are striving to deliver something better than they're offering today. ▼

For real-time pricing, go to *priceit.zdnet.com* and enter number.

ZDNet Price It!™	code
digitalme	33854
Microsoft Passport	33855
v-Go 2.0	33856

< PRODUCT SUMMARY >		
RATED 1 TO 5 STARS ★★★★	★★	★★★
PRODUCT	digitalme	Microsoft Passport	v-Go 2.0
COMPANY	Novell Provo, UT 800-453-1267, 801-429-7000 *www.novell.com*	Microsoft Corp. Redmond, WA 800-426-9400, 425-882-8080 *www.passport.com*	Passlogix New York, NY 212-825-9100 *www.passlogix.com*
REQUIRES	Internet Explorer or Navigator (version 4.x or later of either) with JavaScript and cookies enabled	Navigator or Internet Explorer (version 3.x or later of either)	Pentium processor; 2.5MB hard drive space; Windows 95, 98, or 2000, or NT 4.0 with Service Pack 4
PRICE	Free	Free	Free

WEB PHONE CALLS

dialing
without dollars

Are you annoyed by the confusing array of long-distance calling plans available? If you're like most people, weighing the merits of a 5-cent-a-minute weekend rate versus a 7-cent-a-minute week-night plan is probably pretty low on your list of things to do. Instead, why not think free?
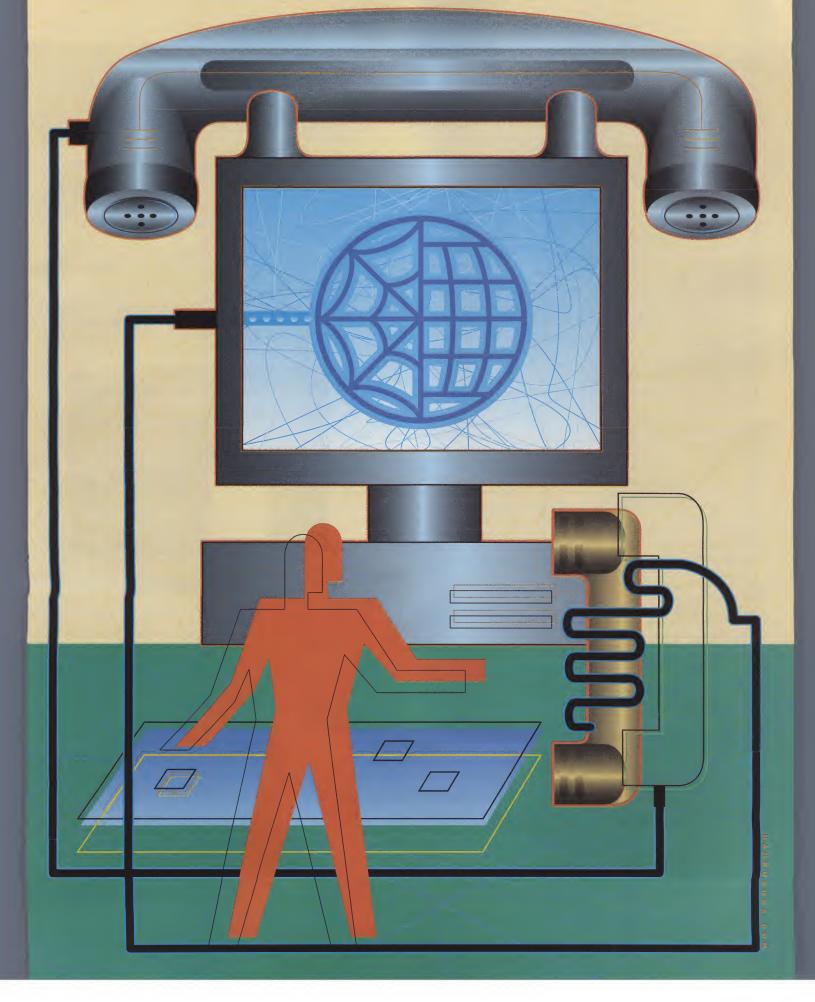
Yep, we're talking free long distance.

By using a standard Internet connection to make your voice calls, you can ignore those costly and confounding long-distance calling plans and save yourself a bundle. And the technology that makes it possible, called voice over Internet Protocol (VoIP), is becoming easier to use, although the quality of calls still lags behind that of traditional phone lines.

VoIP relies on software that transforms your analog voice into digital packets. VoIP service providers, such as Net2Phone *(www.net2phone.com)* and Dialpad.com, send these digital packets over the Internet. When the packets arrive at the other end, they are reassembled and turned into an analog signal that the other person can understand.

And because voice traffic is routed over the Internet in packets that do not tie up a dedicated phone line, most PC-to-PC calls are free. Conversely, standard voice calls take up a dedicated connection between you and the party you are calling and therefore cost much more to make.

ILLUSTRATION BY HANK OSUNA

Making cheap, or even free, phone calls over the Internet is more than a fad—it could be the next big thing.

By John R. Quain

IP, With No PC

Booting up a computer just to call Mom back in Kansas isn't the most convenient way to save money. So Panasonic plans to help you harness the savings of VoIP with just the push of a button—and without the use of a PC.

Priced from $89.95 to $239.95, Panasonic's upcoming line of conventional cordless 900MHz phones offer a variety of features, including a special Net2Phone IP voice button.

According to the company, when you first use the VoIP button, the Panasonic phones will call the local Net2Phone point of presence. You then set up the phone for Internet calling with a 5-minute voice-menu-driven session; thereafter, all you need to do is supply the code for your Net2Phone calling card.

When placing a call, simply push the Net2Phone button, wait 10 to 15 seconds (Panasonic hopes), and you'll be connected over the Net. Of course, if you don't want the hassle of waiting or the chance of a poor connection, you can place calls in the usual way, through your long-distance phone carrier, by not pushing the button.

Net2Phone calls over the Panasonic phones will save you money, but you'll have to pay in advance. Although there's no contract and no bill, users will have to subscribe to Net2Phone. All prices weren't established by press time, but the companies said that the first 60 minutes of VoIP calls will be free, with a domestic rate of 3.9 cents per minute thereafter. International calling prices will vary by country.

Panasonic is betting that Net2Phone will improve the quality of its calls. In fact, the company expects to build 1.5 million of the new phones by the end of this year. ▼

Panasonic KX-TC1801B cordless Net phone

While "free" is the most common word usually associated with VoIP, only PC-to-PC calls are really gratis. To make a call from your computer to a regular phone still costs money. Within the United States, for example, Net2Phone charges 3.9 cents a minute for such calls (versus 7 cents a minute for AT&T). Some overseas calls cost more because other countries may charge termination fees that can be five times those levied in the United States.

The savings potential is what will propel VoIP into the mainstream. According to Parks Associates, voice traffic on packet-switched systems accounted for just 2.5 billion minutes of calls last year, but it's predicted that by 2004 VoIP will carry more than 114 billion minutes of long-distance voice traffic. Already Net2Phone, which began operations in 1996, handles an average of 200,000 calls a day. And Dialpad.com, which launched just last year, signed up more than 500,000 users in its first month and, at press time, claimed more than 8 million registered users.

VoIP first began making waves five years ago, and despite continuing limitations in convenience and sound quality, the technology has steadily matured. Initially, for instance, you could only place calls from one computer to another; now you can make a call from your PC to a landline phone.

This type of service, provided by Dialpad.com, converts your voice into packets that travel from your computer through your Internet service provider and then out to Dialpad's partner, GTE Internetworking. GTE converts your digitized, packetized voice from the Net into an analog signal and then routes that signal to a local telephone company, which in turn puts you in touch with the person you want to reach. This effectively bypasses the long-distance carriers, although GTE sometimes has to pay a small termination fee of less than 1 cent, the cost of which is covered by Dialpad's banner ads.

Some newer VoIP services seem and sound like regular telephone calls. For example, I-Link's V-Link (*www.i-link.com*) offers inexpensive conference calls and follow-me numbers that track you down wherever you are, and it lets you make calls from a standard telephone or cell phone. Your voice travels from your phone company's central office to the I-Link gateway, where it is converted into IP packets and then handled by I-Link's network. This enables I-Link to offer low per-minute rates (less than 3 cents) and unified-messaging-style features.

PARTY LINE

As you can imagine, traditional phone companies—and technology industry heavyweights—are not amused by upstarts trying to break into their markets. But they're not exactly trying to quash VoIP, either.

Rather than trying to beat the VoIP companies, some traditional phone and telecommunications players are hopping on the bandwagon. AT&T, for example, owns more than 30 percent of Net2Phone. And Sprint offers Net2Phone service for some overseas calls. The technology is even gaining ground in Europe, where Germany's

Microsoft NetMeeting lets you easily "dial" someone by entering an e-mail address.

Deutsche Telekom has introduced its own Web-based VoIP service.

The telcos aren't the only ones to see a huge potential in VoIP. America Online's new Netscape 6 browser (*www.netscape.com*) comes with Net2Phone built in. And the popular Internet portal Yahoo has integrated Net2Phone into its People Search section (*people.yahoo.com*). Yahoo users can look up phone numbers online; when they find the right number, they can simply click and call directly from their PCs to that phone.

Even Microsoft is offering a stripped-down VoIP service, as a part of MSN. It takes advantage of CallWave's Internet Answering Machine (*www.callwave.com*) to allow you to be online and see the number and name of a person trying to call you on the same line. You can then accept the call or keep surfing. And at press time, Microsoft had announced that it also plans to offer free domestic calling on MSN (*www.msn.com*) using Net2Phone's software.

LATE NIGHTS ONLY

Considering the potential cost savings, why isn't everyone using the Net to phone home? The main problem is voice quality. You will often hear VoIP calls described as being "cellular-quality." And that's pretty accurate—if you have a lot of cellular problems in your area.

Voices on VoIP are, at best, clipped, with the occasional bit of static and noise mixed in, making a conversation over your PC sound like it's happening over a cheap speakerphone. At worst, words get chopped off, and volume levels waver, rendering speech unintelligible.

There are several reasons for this poor quality. First, the Internet was not designed to handle a consistent flow of data traffic, so getting all the packets of voice data from one end to the other in a smooth and timely fashion can be tricky. Some sections of the Net may be fast, while others are plagued by bottlenecks, which plays havoc with the sound of your voice. Calls made late at night often work well, but you'll notice a distinct deterioration in quality if you place a call in the afternoon in the middle of the work week.

Another issue with PC-to-PC calls is the computers themselves. Using a speaker-and-microphone combination can cause considerable feedback, unless you're careful with the volume controls or use the Push to Talk option often available with these services. Naturally, the more applications you run during a phone call, the more you'll affect the overall performance and the ability of your PC to manage a smooth data flow.

Making a phone call with VoIP can also be a hassle. PC-to-PC calls may be free, but the other person has to be online at the same time and using the same software, which makes finding another VoIP user awkward. With Microsoft NetMeeting, for example, you have to sift through Microsoft's directory to see who's online or scan a variety of third-party online directories.

REACH OUT AND IP SOMEONE

Despite the generally poor quality of VoIP calls, many people remain willing to put up with them for one reason—the price. PC-to-PC calls are free, and those with only one phone line can surf and talk simultaneously. All you need is an Internet connection, a microphone, and a pair of speakers (or a headset) connected to your computer.

More than half a dozen VoIP programs

are already on the market, most of which offer free PC-to-PC calling. The most basic and least expensive of these offerings is Speak Freely 7.1 (*www.speakfreely.org*). Speak Freely is freeware that only lets you place computer-to-computer calls, but it includes answering-machine features and conferencing options.

NetMeeting (*www.microsoft.com/netmeeting*) offers free computer-to-computer calls as well, and the application is included with Windows ME, 98, and 2000. (Windows 95 users can download a copy of NetMeeting for free.) VocalTec's $49.95 Internet Phone (*www.vocaltec.com*) also offers free PC-to-PC calling and, like NetMeeting, includes other, more sophisticated features, such as videoconferencing and various directory services.

NetSpeak's $19.95 WebPhone (*www.netspeak.com*) for home users offers only PC-to-PC connections, although NetSpeak does provide businesses with enterprise software for PC-to-phone calling.

Most programs also let you call a regular telephone from your computer, although they charge a fee for this service. The exception is Dialpad, whose free Java applet offers unlimited domestic PC-to-phone connections without charge.

PhoneFree.com, which has a nifty voice-mail feature, charges a flat rate of $15 a month for unlimited PC-to-phone calls. Net2Phone charges 3.9 cents per minute for calls to anywhere in the United States; international calls cost more. A call to the Netherlands, for example, costs 5 cents a minute. But that's a huge discount over AT&T's fees, which range from $1.25 to $2.05 a minute.

In the future, it should be easier for home users to reach out and IP someone. Toward that end, Net2Phone recently introduced two VoIP-enabled gadgets, the YAP Phone and the YAP Jack.

Not intended to supplant regular phones, YAP is an acronym for Your Alternate Phone. The YAP Phone handset costs $60 and includes a prepaid Net2Phone calling card good for 1,000 minutes of talk time in the United States (1 cent per minute thereafter); PC-to-PC calls are free. The benefit is that you don't need to struggle with speaker and microphone controls, because the YAP Phone simply plugs into a USB connector on your PC.

Net2Phone YAP Phone

Talk of Taxes

Although voice over IP technology is becoming more approachable, many users worry that the days of nearly free long-distance VoIP calls may be numbered. The taxman cometh, they warn.

Indeed, some traditional telecommunications companies and the United States Telecom Association have lobbied to make Internet telephony companies subject to the same treatment as other communications firms, including the taxes and fees paid to the local phone companies that complete the calls.

In response, VoIP service companies made a lot of phone calls complaining about a bill passed by the House of Representatives last spring called the Internet Access Charge Prohibition Act (House Resolution 1291). The bill, which ostensibly bans per-minute charges imposed by the Federal Communications Commission (FCC) on ISPs, includes an amendment that specifically leaves VoIP operators open to such additional charges.

But the resolution apparently has little chance of making it through the Senate. Since its initial passage, lobbying in favor of it has been weak, and White House watchers point out that President Clinton would likely veto it were it to make its way through the Senate.

Moreover, to further stymie the idea of imposing additional charges on VoIP operators like Net2Phone, a conflicting bill called the Internet Telephony Access Charge Prohibition Act (H.R. 4769) has been introduced. It would explicitly prevent the FCC from allowing per-minute access charges on Internet telephony providers. ▼

More convenient still is the $160 YAP Jack. Similar to an answering machine, the YAP Jack, which houses a 56Kbps modem, plugs in between your regular phone and the wall jack. You then configure it to work with your ISP. YAP Jack-to-YAP Jack phone calls are free, but regular domestic calls cost 2.9 cents per minute.

When you want to place a call, the YAP Jack dials your ISP, then connects to Net2Phone's network, which in turn connects you to the party you're trying to reach. When the connection is made, the YAP Jack rings your phone. Waiting to make the connection can take up to a minute, and such delays would doubtless irritate business users. But home users may find the savings worth the wait. On the other hand, the audio quality isn't much better than that of the PC-based

solutions, and you still need to pay an ISP for Internet access.

A similar product, the Actiontec USB InternetPhoneWizard, is available from Actiontec Electronics *(www.actiontec.com)*. For a full review of the InternetPhone-Wizard, see the Reviews section.

VOIP SPEED AHEAD

In spite of these limitations, VoIP remains an attractive technology, not only to consumers looking to save a buck, but also to carriers and phone companies burdened by ever-increasing bandwidth demands.

A conventional voice call over a regular circuit-switched network takes up a dedicated 64Kbps channel. But much of that circuit is wasted with pauses and gaps between words. A packet-switched system can take advantage of those gaps, fitting additional packets into

Dialpad.com lets you easily place calls from your computer to standard landline phones via a Java applet.

the spaces and enabling several conversations to be transmitted over the same channel.

To quiet complaints about choppy voice quality, hardware companies and ISPs are working to make VoIP sound better. Cisco Systems *(www.cisco.com)* and 3Com Corp. *(www.3com.com)*, for instance, are developing upgradable routers that can be adjusted with

WEB PHONE CALLS

Speak Freely 7.1 lets you place free PC-to-PC calls, and includes answering-machine features and conferencing.

software to take on the new demands of VoIP. Meanwhile, VoIP service companies continue to improve their software with features to ensure faster packet delivery. One such innovation is to ping all possible network gateway computers that have access to the public network and then choose the fastest path before establishing a VoIP connection.

But to really make VoIP calls sound like landline calls, we'll all need faster Internet connections. Already, CableLabs *(www.cablelabs.com)* has started testing next-generation cable modems that use the Data Over Cable Service Interface Specification (DOCSIS) 1.1. Among its various enhancements, the new specification aims to improve voice calls over the Internet by prioritizing packets of a voice call so that all the pieces arrive in the right order, at the right time.

You may soon be able to place such high-speed calls over your television, too. Net2Phone is already working with Microsoft on set-top-box software to do just that. And you can expect to see announcements concerning voice-over-DSL services by the end of the year.

Another area in which VoIP service is starting to come into its own is in controlled network environments, such as a LAN. In a small-office or corporate situation, an internal LAN can be managed more easily, promising a certain level of performance. 3Com, for example, now offers small-office systems that accept all standard incoming voice calls, convert them into digital packets, and then pass them through a LAN, guaranteeing high voice quality. Moreover, such systems can save a company thousands of dollars by forgoing a private branch exchange (PBX); by using an internal VoIP system, companies can include a variety of features, including call forwarding and conference calling for free.

THE NEXT GENERATION

As quality of service improves, you'll see more VoIP-related services that connect you

transparently.

Leading the way is I-Link's V-Link service. V-Link delivers features such as a follow-me number that can be set to ring up to nine other numbers sequentially until the calling party reaches you. It also can handle conference calls and be set to redirect faxes and e-mail, and consolidate all messages into one online account. V-Link calls sound just like regular telephone calls, but I-Link's network relies on VoIP to manage all these features. A V-Link subscription costs $9.95 a month.

Also on the horizon, VoIP will become available on handheld and mobile devices. BSquare Corp. *(www.bsquare.com)* plans to release its bInTouch program for Pocket PCs this fall. Expected to cost about $50, the software will let PDA owners place voice calls over the Net. Users will simply plug their handhelds into a network or ISP, and then tap on a number to place a call.

You can anticipate more talking Web sites, thanks to VoIP. Say, for instance, you're surfing for a new power drill but can't seem to find the model you want. A service representative could now pipe in over your speakers, "Can I help you find a particular make?" Cahoots *(www.cahoots. com)*, a free 1.5MB download, is being used by some e-commerce marketers to let sales reps talk to you live over the Net while you surf the site. (For a test drive, check out *www.ferrari.com.*)

Even with all of these features, the Holy Grail of Internet telephony is still to come: unified messaging. If all the voice traffic currently on telecommunications lines were turned into packets of data, it could more easily be managed like e-mail, available along with faxes and text messages in one place. You could have it all read to you over the phone, or call it up online.

And that's a call most people wouldn't mind making. ▼

The Vanguard of VoIP

The following products and services let you place calls using voice over IP.

Actiontec USB InternetPhoneWizard *(www.actiontec.com)*
BSquare Corp. *(www.bsquare.com)*
Cahoots *(www.cahoots.com)*
CallWave Internet Answering Machine *(www.callwave.com)*
Dialpad.com *(dialpad.com)*
I-Link V-Link *(www.i-link.com)*
Microsoft NetMeeting *(www.microsoft.com/netmeeting)*
Net2Phone *(www.net2phone.com)*
Net2Phone YAP Phone, YAP Jack *(www.net2phone.com)*
NetSpeak WebPhone *(www.netspeak.com)*
PhoneFree *(www.phonefree.com)*
Speak Freely 7.1 *(www.speakfreely.org)*
VocalTec Internet Phone *(www.vocaltec.com)*
Yahoo People Search *(people.yahoo.com)*
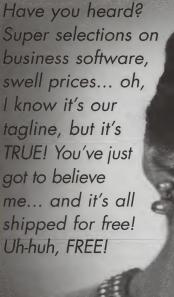
Home
HOME
ON THE
WEB

Before you spend another weekend with your real-estate agent, spend some quality time with your Web browser.

by Nancy A. Lang

Every weekend it's the same thing. Scour the Sunday paper, tour open houses, check out your real-estate agent's latest listing. Then there's the time spent schlepping from bank to bank in search of a mortgage.

Wouldn't it be nice if the Web could make this process easier? Well, it can. While nobody should be foolhardy enough to buy a house sight unseen via the Internet, the Web can be an invaluable tool for doing much of your legwork right from your keyboard. Online calculators tell you how much you can afford. Financial sites reveal the going mortgage rates in your region. Online lenders deliver the prequalification letters many agents require before they'll take you across the threshold. You can even apply for a mortgage from the comfort of your living room.

You'll find countless Web sites listing homes for sale by owner and through brokers. These listings bring you the particulars of a property, such as exterior (and sometimes even interior) photos, school-district information, the tax rate, the age of the house, and the type of construction, so you can narrow your search for your future domicile without leaving your present one.

CAN YOU AFFORD IT?

Before you even start your search, do a reality check. You can see yourself enjoying sunsets on the deck of that five-bedroom waterfront contemporary, but lenders may lack your vision. They use set qualifying ratios to determine how much you can afford to spend each month for principal, interest, tax, and insurance (PITI): typically either 28 percent of your gross monthly income or 36 percent of that amount minus your monthly debt, whichever is lower.

You can do your own calculations, but the Web makes it easier with numerous online financial calculators. (See the sidebar "Affordability Calculators.") One fine example is Hugh's Mortgage and Financial Calculators *(www.interest.com/hugh/calc)*. Scroll down and click on "How much house can you afford?" Then fill in the fields. To calculate credit-card debt, add up the minimum monthly payments on all your cards. The default mortgage rate at the time we visited Hugh's site was on the high side, at 8.25 percent, so before you continue, you may want to change it to a more realistic number. While rates vary by region, the national average at this writing was about 7.8 percent. For an idea of mortgage rates in your area, you can turn to sites such as Yahoo *(biz.yahoo.com/b/r/m.html)* or bankrate.com and select a region. (See the sidebar "Mortgage Rates.")

When considering how much cash you have for a down payment, don't forget to factor in closing costs. These costs can run anywhere from 3 percent to 6 percent of the mortgage amount, depending on the area of the country. New York, for instance, is at the top of the scale, at 6 percent. Items included in closing costs also vary across the country, but they usually include title insurance, attorney fees, a survey fee, discount points, transfer taxes, and document-preparation fees.

PHOTOGRAPH BY BILL MILNE

REAL-ESTATE SITES

START HUNTING

Now that you have a good idea what you can afford, you can start your virtual house hunt. This is no easy feat, considering how many real-estate sites are on the Web. Along with Realtor.com, the official site of the National Association of Realtors, you'll find national broker sites such as Century 21 (www.century21.com), regional sites such as Hamptons Real Estate Online (www.hreo.com), and Web-only megasites such as CyberHomes (www.cyberhomes.com). You'll also find sites specializing in homes for sale by owner, or FSBOs (pronounced "fizbos" in the business), such as FSBO (www.fsbo.com) and byowner.com. In addition, portals such as Lycos and Yahoo offer local directories of real-estate agencies as well as classified ads. (See the sidebar "Virtual House Hunting.")

To get a comprehensive view of what's out there, check as many sites as possible. Most towns have their own multiple-listing services (MLSs), and these are good sites to find, because you can view the listings of many different agencies all in one place. Try entering "MLS AND your state" in your favorite search engine to find the MLS site in your area. If you're looking for a home on Long Island, for instance, MLSLIRealtor.com (www.mlsli-realtor.com) is a great place to start. The site displays the listings of more than 1,500 Long Island real-estate offices. You can start your search by selecting a county (Nassau, Suffolk, or Queens), then refine it by entering minimum and maxi-

mum prices, choosing single- or multifamily, and specifying the number of bedrooms and bathrooms you're looking for, the length of time the listing has been available, and the particular amenities (eat-in kitchen, fireplace, basement, waterfront, water view, garage, pool) you're seeking.

For the granddaddy of all multiple-listing-service sites, go to Realtor.com. It features more than 1.3 million listings, plus apartment and rental listings, information on financing and insurance, a mover's checklist, tips on home improvement and decorating, even help with your new home's weed-ridden excuse for a garden. The site also provides information on the different types of mortgages, a Personal Planner that lets you store your favorite listings, and neighborhood research.

Realtor.com's apartment listings are rather anemic, though; we couldn't find a single listing in Bayside, N.Y. In fact, we couldn't even verify Bayside's existence. But we did find tips for creating a résumé for your pet—useful if your potential landlord is sold on you but not your pit bull. The best place to hunt down a rental is still in your local paper's classified ads.

Another megasite, MSN HomeAdvisor (homeadvisor.msn.com), offers such features as a step-by-step guide to finding and buying a home, virtual home tours, and links to insurance and financing information. You can also store your favorite listings and have new listings sent by e-mail.

It also pays to check individual agencies' sites, because they may have exclusive listings only they will sell. To find agency sites in your area, try a directory at one of the major portals. At Yahoo, for instance, clicking on Yellow Pages, then on Agents (under Real Estate) brings up an alphabetical list of agencies. If you've used Yahoo Yellow Pages before, the location will be the one you selected the last time you used it. To look in another town, click on Change Location.

Keep in mind that these Web sites may not reveal the most complete and up-to-date offerings. Small agencies often lack the manpower to update their sites on a regular basis, so many of the listings may be off the market or already sold. And just like many of the ads you see in print, Web-site listings may be intended to get you to pick up the phone. When you call, you may be told that "that one's sold, but we have others."

In some parts of the country, real-estate agencies have been slow to embrace the Web, so newspaper classifieds are still an important part of your search. Many local newspapers make their real-estate classified ads available on their Web sites, and the search tools they offer make it a lot easier than poring over paper ads.

In addition, you can find a wealth of classified ads and information directories at the major portals. At the Lycos Network's HotBot (www.hotbot.com), for instance, clicking on Business & Money and then Real Estate brings up a number of useful directories, including home builders and inspectors. You'll also find rental and FSBO listings. Both Lycos (www.lycos.com/realestate) and Yahoo (realestate.yahoo.com) offer real-estate guides that can be as comprehensive as some of the megasites.

FSBO listings are the toughest to find online, because most of the listings on the Web are offered through real-estate agents.

AFFORDABILITY CALCULATORS

How much house can you afford? Find out by plugging your financial information into one of these online calculators.

bankrate.com ....bankrate.com/brm/calc/afford_smm.asp
Bloomberg.com.................................bloomberg.com/money/loan/mtge_calc.html
FinanCenter.com ....financenter.com
Hugh's Mortgage and Financial Calculators ....www.interest.com/hugh/calc
Quicken.com ....quickenloans.quicken.com/Tools/Affordability/AffordQuery.asp

A Renter's Life for Me
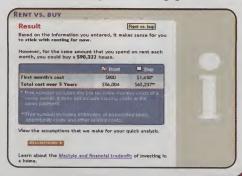
Most of us have been brought up thinking it's better to own. But in today's market, that's not always true. Home prices are high, and mortgage rates have been climbing. If your rent is low and you're pleased with your quality of life, you may be better off staying right where you are.

There's an easy way to find out. Just plug some information into a rent-vs.-buy calculator at one of the finance sites. At iOwn (www.iown.com), for instance, just click on Buy a Home, then Rent vs. buy, and fill in the fields. You may be surprised at the results.

REAL-ESTATE SITES

Because it's the seller, not the buyer, who pays the commission in real-estate transactions, you may be able to negotiate a better price by going directly to the home owner. Although it sometimes may seem like a real-estate agent is working for you, the agent's fiduciary responsibility is to the seller, unless that agent agrees to represent both parties. Representation of both parties, known as dual agency, is rare, however. In most cases, the seller works exclusively for the home owner and is obligated to get the seller the best possible price.

If you want to buy your home directly from an owner, you can try one of the sites that list FSBO ads only. The trouble is, these sites typically don't have enough listings to be of any real value. For instance, when we searched the FSBO site for a $400,001-to-$500,000 home in Port Washington in Nassau County, Long Island, we couldn't refine our search any further than Nassau. The search resulted in only five listings, none of which was in Port Washington. At byowner.com, we were able to refine our search to Port Washington, but the search turned up only one listing at any

price. By contrast, MLSLIRealtor.com had 53 listings in Port Washington. The best way to hunt FSBOs is still by perusing your local paper and by using the old-fashioned method of cruising a neighborhood in search of For Sale signs.

Cruising the neighborhood is also a good way to see if it's the kind of place you'd like to live. What types of stores are nearby? Are there any good restaurants? What about movie theaters? A couple of Web sites can save you some mileage in this area, too. Select a locality at CitySearch.com to find out all sorts of information about your new hometown, including restaurants, movie theaters, shopping, and recreation. For information of a more socioeconomic

nature, check the Where to Live section of Homefair.com. You can compare the cost of living, demographics, and schools in hundreds of U.S. and international cities, and even identify neighborhoods that have demographics similar to those of your own. At iOwn *(www.iown.com)*, you'll also find this information.

MORTGAGE RATES

Find out the going rate for a mortgage, nationally and in your area.

American Mortgage Online ....**www.amo-mortgage.com/rate.html**
bankrate.com ....**bankrate.com/brm/rate/mtg_home.asp**
Bloomberg.com ....**bloomberg.com/markets/rates.html**
iOwn ....**rateshop.iown.com/scripts/ crateshop.dll?center=Buy&MSPARTNER=stihpqr**

Though the Web can't eliminate all the preliminary work, if you want to be sure to exhaust all avenues, it can save you days, even weeks, of driving-around time. With smart surfing, you can even accomplish in a few hours what could have taken a month's worth of weekends. You can tour dozens, maybe hundreds of homes online, and rule out many you would otherwise have had to see physically before being able to cross them off your list. Now you can pick up the phone and start making appointments.

ARE YOU (PRE)QUALIFIED?

Before you begin looking at actual homes, it's a good idea to get a prequalification or preapproval letter from a lender. You can do this on the Web for free at any mortgage site (see the sidebar "Online Lenders"), and you're under no obligation to obtain your loan from the site that prequalifies you.

In a seller's market, many real-estate agents won't even take a buyer to a listing without a prequalification letter, and some even require preapproval letters. While neither represents a loan commitment, the preapproval letter is more thorough, requiring such documentation as recent pay stubs, W-2 forms, bank statements, and possibly income tax returns. A lender may write a prequalification, on the other hand, with nothing more than a credit report and verbal income data from the borrower. Even if you're looking at a FSBO, a prequal letter earns you some negotiating clout with the seller. Just make sure the price listed in the

letter isn't more than you want to spend, or the seller may not be so willing to agree to a price below that amount.

MORTGAGE SURFING

Once you've found your dream house and the seller has accepted your offer, it's time to start shopping for a mortgage. This is another area where the Web can save you tons of time and possibly some money as well. You can't walk into a bank and fill out a loan application at 3 a.m., but you can log onto the Internet and complete one online anytime. Plus, in many cases, rates are lower online, especially among online-only lenders, whose overhead costs are lower than those with a brick-and-mortar presence.

Unlike shopping for a home, where so many subjective factors come into play, your only concern when shopping for a mortgage is finding the lowest possible rate. You may not think a quarter of a percentage point makes a difference—until you do the math. On a $250,000 mortgage, for instance, the difference between 8 percent and 8.25 percent over 30 years amounts to nearly $16,000. (For a quick, do-the-math-in-your-head calculation, figure you'll pay around $7 per $1,000 per month at a 7.5 percent interest rate and $7.50 at 8.25 percent.)

This is why examining the rates of as many institutions as possible is so important,

ONLINE LENDERS

Apply for a mortgage online.

E-Loan..............................**www.eloan.com**
iOwn ....**www.iown.com**
LendingTree ....**www.lendingtree.com**
LoanWorks...............**www.loanworks.com**
WingspanBank.com .....**wingspanbank.com**

and the Web lets you do this easily. You don't have to take time off from work to be sure you're there before 3 p.m.; just fill out a form at sites such as E-Loan *(www.eloan.com)*, or LendingTree *(www.lendingtree.com)*, at any time of the day or night, and you'll receive rates from multiple lending institutions in your geographic area. Most of these sites act as mortgage brokers, but some, such as E-Loan, act as both mortgage broker and lender,

REAL-ESTATE SITES

searching and comparing the rates of more than 70 lenders and, depending on the state you're in, possibly throwing their own loan offerings into the ring.

Most traditional brick-and-mortar banks also let you apply for loans online. Check the Web sites of the major commercial banks, or look for local savings and loans in the yellow pages of your favorite portal.

various mortgage products they offer, and many sites, including bankrate.com and Fannie Mae's Homepath.com *(www. homepath.com)*, offer glossaries that define some of the different types of mortgages. You'll learn, for instance, whether you're better off with a fixed-rate or an adjustable-rate mortgage (ARM). Bankrate.com's glossary explains that the interest on an ARM can fluctuate, whereas your rate is locked in for the entire term with a fixed-rate mortgage.

As a rule, if mortgage rates are low, you're planning on living in your home for a long period of time, and you like the peace of mind of knowing your rate will never go up, most sites will recommend a 30-year, fixed-rate mortgage. But if mortgage rates are high, you're not planning on staying in your new home long, and you anticipate making more money down the road, the lower interest rate an ARM offers may be more appealing. It may even enable you to afford more home for your money.

Another mortgage term you should understand is points. Fannie Mae's Homepath.com defines a point as "a one-time charge by the lender for originating a loan." Put more simply, a point equals 1 percent of your mortgage amount. By paying points, you're prepaying part of your mortgage. No-points mortgages come with a higher interest rate, but if you're low on funds for the down payment, this could be just what you need.

If your down payment is less than 20 percent of your purchase price, however, you're required to buy mortgage insurance, a premium that could add around $150 to your monthly expenses, depending on your mortgage amount. If you don't have the 20 percent, some lenders offer options that let

you share the down-payment cost with more than one lender. For instance, iOwn discusses details about 80-10-10 mortgages, whereby you take out one mortgage and put down 80 percent, and borrow the other 10 percent from another lender.

If the amount you wish to borrow is under $252,700 for a single-family home, you may qualify for a Fannie Mae mortgage. Find out by checking Fannie Mae's Homepath.com. Even if you don't qualify, Homepath is an excellent resource for all aspects of home buying. The Getting Started section walks you through the initial stages of the home-buying process, from home selection to qualifying for a Fannie Mae mortgage. You'll also find property listings and an extensive glossary of real-estate terms.

Competition in the mortgage business has given rise to a number of other types of mortgage products as well. Keep in mind that whatever you're not paying up front (closing costs, points, down payment), you're likely paying on the other end by way of higher monthly payments. Just be sure you understand your total commitment before you sign on the dotted line.

IT'S CLOSING TIME

So you've found the home of your dreams, or at least one that doesn't give you nightmares, and you've gotten your mortgage commitment. The hard part is behind you, right? Not exactly. You may think you've steeled your financial nerves until you're locked in a room with a bunch of lawyers signing away the last of your life's savings. A home will probably be the biggest purchase you'll ever make, and there's no downplaying the stress level of a real-estate closing.

But because you've used the Web as your primary resource, after all the papers are signed and you've exhausted your supply of checks, you can be secure in the knowledge that you found a home you can afford at a fair price and a mortgage that is well within your means. ▼

VIRTUAL HOUSE HUNTING

Homes for Sale by Owner

byowner.com	*byowner.com*
FSBO	*www.fsbo.com*

Megasites

CyberHomes	*www.cyberhomes.com*
Homenet	*www.homenet.com*
Homes.com	*homes.com*
HomeSeekers.com	*homeseekers.com*
MSN HomeAdvisor.com	*homeadvisor.msn.com*
Realtor.com	*realtor.com*

National Agencies

Century 21 Real Estate Corp.	*www.century21.com*
Coldwell Banker Corp.	*www.coldwellbanker.com*
Prudential	*www.prudential.com/realestate*
Re/Max International	*www.remax.com*

Portal Directories and Guides

HotBot directory	*dir.hotbot.lycos.com/business/real_estate*
Lycos Real Estate guide	*www.lycos.com/realestate*
Yahoo directory	*dir.yahoo.com/business_and_economy/ real_estate*
Yahoo Real Estate guide	*realestate.yahoo.com*

You can also click on one of the numerous banner ads that come up while you're searching for a home online.

LOAN LINGO

Once you have a sampling of loans to choose from, you can view online all the details of the loans, including points, closing costs, terms, any prepayment penalties, and the period of time for which the rate is good (referred to as the "lock period"). When you find a loan that suits your needs, you can apply online as well. If you're approved, the lender will mail you documents for your signature.

Before you apply for a mortgage, however, make sure you know your options and understand all the associated costs. Lenders' sites give you a rundown of the

Web Buyer

Site Reviews for
Online
Shopping

decisions,
decisions,
decisions.
and not a wrong one in the bunch.

DELL™ *INSPIRON™* 5000e ■ DELL™ *INSPIRON™* 3800 ■ DELL™ *INSPIRON™* 7500

Until now, choosing the perfect notebook could be a tricky decision. From mobility to price to out & out raw power, everyone is looking for something different. That's why our award-winning line of Inspiron™ notebooks offers a range of innovations and technological benefits. But whichever Inspiron you choose, they all have one thing in common. Our Standard Next-Business-Day On-site Service⁴ offering — just part of our award-winning service promise. Dell4me™ is all about helping you get the most out of your PC. A notebook customized to fit your needs is just one of the ways we're making it happen.

CHOOSE YOUR NOTEBOOK, THEN CUSTOMIZE IT EVEN MORE.

DELL™ INSPIRON™ 3800

Design and Affordability

Very affordable. Very lightweight. Not bad looking, either. It's beautifully designed and available in Forest Green, Sierra Maroon, Midnight Grey, and Tahoe Blue. You'll find it delivers quite a bit of digital bang for your hard-earned buck.

Best Buy, Budget Notebook Category
PC World, June 2000

- Intel® Celeron™ Processor at 500MHz
- 14.1" XGA TFT Display
- 64MB 100MHz SDRAM
- 6GB⁵ Ultra ATA TFT Hard Drive
- Modular 24X Max CD-ROM
- 2X AGP 8MB ATI RAGE Mobility™-M1 3D® Video
- 26.5WHr Li-Ion Battery with ExpressCharge™ Technology
- MS® Works Suite 2000 ■ MS® Windows® Me³⁹
- 1-Yr Limited Warranty²
- 1-Yr Next-Business-Day On-site Service⁴

$1699 ◈ E·VALUE CODE 05871-800916
As low as $46/Mo., for 48 Mos.¹⁷

DELL™ INSPIRON™ 5000e

Performance and Mobility

Introducing the newest member of the Dell™ Inspiron™ family, the 5000e. With all the power, size, and mobility of its predecessor, this baby also has the NEW 15" Ultra XGA display and features 16MB ATI RAGE Mobility™ 128 3D® video. Both improve your view for a better overall experience.

- Intel® Pentium® III Processor at 700MHz Featuring Intel® SpeedStep™ Technology
- 15" Ultra XGA TFT Display
- 64MB 100MHz SDRAM
- 5GB⁵ Ultra ATA Hard Drive
- Modular 24X Max CD-ROM
- 2X AGP 16MB ATI RAGE Mobility™ 128 3D® Video
- 59WHr Li-Ion Battery
- Internal V.90 56K Capable⁶ FaxModem
- MS® Works Suite 2000 ■ MS® Windows® Me³⁹
- 3-Yr Limited Warranty²
- 3-Yr Next-Business-Day On-site Service⁴

$2599 ◈ E·VALUE CODE 05871-800925a
As low as $71/Mo., for 48 Mos.¹⁷

DELL™ INSPIRON™ 7500

Mobile Desktop

Need a portable desktop with a 15.4" screen and a NEW Intel® Pentium® III processor that delivers speeds up to 750MHz? Rarely do you encounter so much raw power concentrated into such a neat package.

CNET Editor's Choice Award,
Inspiron™ 7500 G650VT, January 2000

- Intel® Pentium® III Processor at 750MHz Featuring Intel® SpeedStep™ Technology
- 15.4" Super XGA TFT Display
- 96MB 100MHz SDRAM
- 20GB⁵ Ultra ATA Hard Drive
- Removable Combo 24X Max CD-ROM and Floppy Drive
- 2X AGP 8MB ATI RAGE Mobility™-P 3D® Video
- 79WHr Li-Ion Battery
- Internal V.90 56K Capable⁶ FaxModem
- MS® Works Suite 2000 ■ MS® Windows® Me³⁹
- 3-Yr Limited Warranty²
- 3-Yr Next-Business-Day On-site Service⁴

$3199 ◈ E·VALUE CODE 05871-800931a
As low as $87/Mo., for 48 Mos.¹⁷

DELL4me.com

contact us today | **800.433.3497** | www.dell4me.com | DELL◈COM™

We tossed out the bricks. Threw away the mortar. Then disposed of the competition.

Transforming egghead into a pure Internet company has been great for our customers—but not so great for our competition. Fact is, egghead.com has taken over the top spot in many of the key rankings of the online world, including:

#1 online consumer electronics shopping site
– Nielsen//NetRatings, 2/00

#1 retailer of technology products among US home web users
– PC Data Online, 2/00

#1 in "ease of use" category
– Gomez.com, Spring 2000

#1 in average order size (dollar)
– NextCard E-commerce Index, top 5 rated sites, January 2000

What's more, traffic is up more than 600%. So if you're looking for the best place to buy office and home technology products—as well as place your bids in our auction section—visit egghead.com today. It's your basic win/win/win/win situation.

THE NEW EGGHEAD.COM™
The computer store inside your computer.

WebBuyer

Scary Sites to See

Here are 20 Halloween destinations that provide a full array of gruesome goods and good, mean fun.

by Elaine X. Grant

Ah, Halloween, that special day of the year when you get to dress like a freak, act like a lunatic, and scare the socks off of little kids who ring your doorbell. And no one even calls the police!

Now's the time to start planning for fright night. First, you'll want to get into the spirit of the holiday with some history and spooky tales. **Halloween on the Web** *(www.allhallowseve.com)* spins a detailed history of the holiday and offers tips on makeup and trick-or-treating safety, as well as a create-your-own jack-o'-lantern app and "true" ghost stories sent in by site visitors.

For an excellent overall guide to the frightening festivities, visit **HauntWorld.com.** The site is a smorgasbord of all things Halloween and includes useful components such as a list of haunted houses throughout the United States; an online store that sells makeup, gifts, masks, and movies; an auction section where you can buy and sell gruesome goods; tips on trick-or-treating safety; message boards; a Halloween search engine; and a list of links.

Similarly, **Everything Halloween** *(www.everythinghalloween.com)* lists links to sites specializing in haunted houses, games, costumes, and events. **HalloweenMagazine.com** collects links for costumes, makeup, recipes, books, and Halloween history. The winner for sheer number of links, **Halloween Online** *(www.halloween-online.com)*, connects you with Halloween stores offering a wide range of products (we like the Fogmaster) and sites of questionable taste, such as the **Guide to Halloween Weddings** *(www.halloweenweddings.com)*.

Sites focused on selling Halloween merchandise include **The Chamber of Horrors** *(www.chamberofhorrors.com)* and **Halloween Outlet** *(www.halloweenoutlet.com)*, both of which aim to scare you into opening your wallet to buy costumes, props, masks, makeup, prosthetics, and party supplies. The best online shopping sites we found were **Halloweenmart** *(www.halloweenmart.com)*, **Haunted Planet** *(www.hauntedplanet.com)*, and **Halloween Direct** *(www.halloweendirect.com)*. Halloweenmart and Haunted Planet both offer a wide selection of costumes. Haunted Planet also specializes in masks and high-end haunted-house effects, while Halloween Direct sells more inexpensive and predictable props such as tarantulas and severed hands. If you like your Halloweens gruesome, Haunted Planet and Halloween Direct both have all sorts of horrible things in store, including bags of flesh, tombstones, fangs, and (perhaps the most disgusting of all) rotten heads.

While most of these sites have no shortage of costume ideas and products for sale, one site focuses on nothing else. **The Costume Page** *(users.aol.com/nebula5/hallocst.html)* offers a long list of costume-related sites, including ideas, patterns, safety tips, and even articles. Some of the material is a bit dated, but true scariness never goes out of style.

If you prefer jack-o'-lanterns to decomposing body parts, several sites cater to milder sensibilities. For those who need to practice their pumpkin-carving skills, **Pumpkin Masters** *(www.pumpkinmasters.com)* serves up step-by-step carving instructions accompanied by photos and sells carving kits, knives, goop scoopers, patterns, and kits for kids. If you consider yourself a particularly gifted pumpkin sculptor, the site also awards prizes for the best craftsmanship. Need advice from an expert before you enter that contest? Visit **Designer Pumpkins** *(www.designerpumpkins.com)*, which sells a book and video by pumpkin carver extraordinaire Jerry Ayers.

Not everyone, however, is cut out for carving a messy pumpkin. Fortunately, there are **Fun-Kins,** artificial pumpkins ($29.95 each), that can be sculpted like the real deal. Check out **www.funkins.com** to see how you can create realistic-looking jack-o'-lanterns without making a mess.

After the knives are put away, direct the kids to **Kid's Domain Halloween** *(www.kidsdomain.com/holiday/halloween)* for software, clip art, games, craft projects, sounds, personalized stories, lists of Halloween books, and jokes. (Did you hear what happened to the boy and girl vampires? They loved in vein.)

Another good site for young children and their parents is **Halloween Tricks and Treats** *(www.night.net/halloween)*, which has stories, poems, songs, games, and recipes for party favors and treats.

So you have your jack-o'-lantern, your costume, your props, and your makeup at hand. Now you need some scary music (and we don't mean the Beastie Boys). It's a must-have for those homemade haunted houses, and **CDNow** *(www.cdnow.com)* carries a staggering array of Halloween titles, including sound effects, movie soundtracks, stories, and Halloween songs.

For those who are a bit fanatic about the whole Halloween thing and want to take a trip to celebrate the occasion, check out **HalloweenNet** *(www.halloweennet.com)*. In addition to providing a wealth of tips on how to make the best haunted house and a list of scary movies and TV specials, HalloweenNet also lists real-life haunted places such as Transylvania and the Winchester Mansion in San Jose, Calif., and information on how to get there.

If you just can't bring yourself to celebrate the scary season with candy and costumes, at least send an e-mail card, several of which are available at **UNICEF Halloween Fun** *(www.supportunicef.org/halloween)* and Kid's Domain Halloween. Happy haunting! ▼

Haunted Planet

WebBuyer

SITE REVIEWS

SITE REVIEWS FOR ONLINE SHOPPING

COMPILED BY KEVIN SAVETZ AND ABIGAIL CRANE

PC SHOPPING SITES

The sites in this listing sell products from multiple manufacturers. See the sites under "PC Direct Vendors," or check the *Computer Shopper* Source Directory *(cgi.zdnet.com/slink?8145)*, for more information on PC manufacturers offering only their own brands (such as Dell and Gateway).

aberdeeninc.com

👍 volume pricing • smooth navigation • easy ordering
👎 limited software selection

Built for the savvy consumer who craves technical information, **Aberdeen** offers extensive specs on a wide variety of computers and accessories.

accessmicro.com

👍 smooth navigation • easy ordering

Shoppers will enjoy the selection at **Access Micro,** which offers 45,000 items ranging from memory to T1 routers. The help desk and hardware guide provide aid to first-time visitors.

Access Micro

www.applied-computer.com

👍 smooth navigation
👎 handling fee on orders under $200

Selling PCs and supplies since 1984, **Applied Computer** promises to match or beat any advertised price. The company stocks 800,000 products—check the site's list of the 1,000 most popular ones.

blackbox.com

👍 smooth navigation

Specializing in cabling and network-connectivity products, **Black Box's** extensive 900-page catalog of storage, LAN, switch, surge-protection, and other accessories can be viewed online or off.

buy.com

👍 price-matching policy • smooth navigation • easy ordering • good return policy

You'll find everything from computers and software to electronics, books, movies, music, and video games at this monstrous, multifaceted site. **Buy.com** sells a whopping 850,000 items. Despite the site's mind-blowing selection, shopping is fast and efficient.

cablestogo.com

👍 hard-to-find tools and test equipment
👎 $30 minimum order requirement

Cables To Go sells every conceivable cable, cord, or wire your PC might need, from standard SCSI to esoteric system-specific cables. You'll also find networking products and all sorts of adapters.

cdw.com

👍 list of rebates and coupons • business leasing options available • smooth navigation • easy ordering

CDW offers an impressive array of hardware and software. The comparison tool lets shoppers create side-by-side comparisons in many product categories.

compuplus.com

👍 easy ordering • good return policy

Comp-U-Plus highlights its customer service, offering a 30-day money-back guarantee and free technical support. Its catalog isn't the biggest, but plenty

of name brands are represented, and prices are reasonable.

compusa.com

👍 smooth navigation • easy ordering

CompUSA is a well-organized site offering a fair amount of PC hardware, accessories, and software, with electronics and video-game gadgets rounding out the selection. Don't overlook the site's clearance section.

computability.com

👍 handy side-by-side product-comparison tool • smooth navigation • easy ordering

Beginning its mail-order business in 1982, **ComputAbility** has aged considerably better than the Commodore 64 you bought that year. The site offers desktop, notebook, and handheld computers, plus a wide variety of peripherals and software.

computercomputer.com

👍 easy ordering

Interested in buying components and piecing together your own PC? **Computercomputer.com** sells bare-bones systems that make a good starting point.

computers4sure.com

👍 smooth navigation • easy ordering • good return policy

The 15 well-stocked departments at **Computers4Sure.com** include networking equipment, peripherals, PDAs, scanners, and more—the selection spans 60,000 products. Fast and intuitive, the site delivers handy features

www.officemax.com

W hether you need a palette of PDAs or just a box of low-tech paper clips, you'll find it at **OfficeMax.** The site sells an enormous variety of paper products, writing instruments, furniture, office machines, and technology products. To simplify supply shopping, you can enter the manufacturer and model of your fax machine, copier, or printer, and the site will generate a list of compatible items—toner, paper, and so on.

Best Site Award
October 2000

OfficeMax also provides useful articles (such as "Stress Reduction for Entrepreneurs") and buying guides (on topics ranging from buying envelopes to choosing a CD burner). A simple all-in-one rebate form makes it easy to apply for manufacturers' discounts and other special offers. In addition, some products feature no-forms instant rebates.

OfficeMax offers free next-day delivery on orders totaling more than $50. Many product categories are covered by a low-price guarantee, which promises to match competitors' prices and give you a credit for 55 percent of the difference.

OfficeMax partners with affiliates in the MaxSolutions section of the site to provide financial services, a unified messaging center, and printing services. Registered users can access My OfficeMax, a centralized tool for maintaining shipping addresses, billing information, and other account details. A complete history of past orders is available.

OFFICEMAX		
Main focus: Office supplies, furniture, technology products		
Additional categories: Software, business services		
Number of products offered: 20,000		

for choosy shoppers. Bargain hunters can quickly sniff out deals on the Special Offers and Clearance pages.

computershopper.com

👍 smooth navigation

Computer Shopper's own computer-buying site, **computershopper.com,** provides access to product reviews, interactive guides to choosing a desktop or a notebook, and How to Buy sections for the most popular product categories.

computersurplusoutlet.com

👍 consignment service

Frugal shoppers and do-it-yourselfers will feel at home at **Computer Surplus Outlet,** a computer hardware liquidator. The company sells closeouts, over-stocks, refurbished equipment, and liquidation items at bargain-basement prices. You can find complete, assembly-required Pentium systems for less than $100.

cqk.com

👍 smooth navigation

Designed for folks who know what they want, **Computer Quick** offers plain-box, best-buy, and closeout merchandise in addition to a selection of more than 90,000 items in regular stock.

cyberrebate.com

👍 "100% Off" tab shows 300 products whose rebates equal their cost.
• smooth navigation • easy ordering
• good return policy
👎 rebates take 10 to 14 weeks to process

CyberRebate.com only sells products that come with money-back rebates. You'll find a small selection of computer accessories and software. In addition, the site offers electronics, office supplies, toys, and kitchen items.

cyberwarehouse.com

👍 smooth navigation • good return policy
👎 may take up to three days to ship

onvia.com

Onvia.com bills itself as a business-to-business marketplace. Indeed, it offers many business-oriented features that distinguish it as a small-business resource rather than a traditional online computer-products store.

The site's selection of computer hardware, software, and office products spans 37,000 items. In-stock products are shipped within one to two days of the order, and frequent free shipping deals help keep transaction costs down. Shoppers are covered by the company's 30-day price-protection guarantee: Any purchase can be returned for any reason for a full refund within 30 days.

The site's Request for Quote marketplace is a small-business-services trading hub that you can use to seek out the services of a copywriter, an insurance provider, or any of a dozen other types of professionals. Buying guides will help you make an informed choice, whether you're in search of a janitor or a photocopier service technician.

The Auctions area allows members to buy and sell inventory in categories that include aircraft, real estate, and industrial equipment. The site's informative News & Tools section features business news, expert advice, product reviews, and community forums. You can even zoom in on business news in your particular industry or region.

ONVIA.COM	
Main focus:	Computer and office products
Additional categories:	Auctions, business services
Number of products offered:	37,000
Areas of development:	Web hosting for small businesses

SITE REVIEWS

If you're the kind of shopper who can't pass up a bargain-basement sale or an outlet mall, this site may be for you. **CyberWarehouse** offers PCs, monitors, printers, and other peripherals.

www.dalco.com

👍 international and APO/FPO orders
• smooth navigation

Dalco stocks everything from motherboards to monitors. Bargain hunters will want to start with this site's specials, which are shown on the home page and change regularly.

www.damark.com

👍 smooth navigation • easy ordering • good return policy

Damark offers a variety of PCs and notebooks, as well as accessories, digital cameras, and home electronics. Factory-serviced items are available, and the outlet area delivers low prices on items in short supply.

direct411.com

👍 easy ordering

Direct411 offers an impressive selection of 50,000 in-stock hardware and software products. The catalog includes servers, memory upgrades, storage devices, digital cameras, and software.

dirtcheapdrives.com

👍 detailed archive of technical-support information • quantity discounts available • smooth navigation • easy ordering

If you can store data on it, this site sells it. **Dirt Cheap Drives** offers deals on hard drives, CD-ROM and DVD hardware, drive arrays, and hard-to-find laptop storage. This 10-year-old company also stocks mounting kits, media, and other accessories.

ecost.com

👍 same-day shipment on most orders
• photos and warranty details for most products
• smooth navigation • easy ordering

The **eCost.com** catalog spans the full realm of PC hardware and software, including ready-to-use systems, peripherals, accessories, software, and games. Featured specials in each category point shoppers to the best deals, and fastidiously organized subcategories help them find the exact products they need.

egghead.com

👍 smooth navigation • easy ordering

Egghead.com shoppers can browse the hardware, software, and electronics superstores, or check out the deals on surplus computer merchandise. In addition, the site also sells home electronics, sports and fitness merchandise, and travel packages.

electrified.com

👍 30-day guarantee on all items
• se habla español • good return policy

Looking for deep discounts on older laptops, notebooks, monitors, and printers? **Electrified** specializes in products that are discontinued, second-inventory, refurbished, off-lease, or otherwise not state-of-the-art. Systems range from new Pentium II laptops to under-$200 used 486s.

elinux.com

👍 smooth navigation • easy ordering
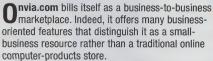
The **eLinux.com** site offers hardware and software for users of the Linux operating system. Desktop and notebook systems for sale here have been tested with Linux and don't come bundled with that "other" OS.

firstsource.com

👍 real-time online customer service
• smooth navigation • easy ordering

Focused on the *technology needs of* businesses, **Firstsource** offers a broad range of choices in computer hardware, rack-mount systems, network tools,

phone systems, wiring, and business software.

gogocity.com

👍 smooth navigation • easy ordering

You'll get beyond **GoGoCity.com's** funny name when you see its excellent selection of computer hardware. You'll find desktop and notebook computers, peripherals, software, and PC accessories of all types. Detailed product information, often with pictures, rounds out the catalog.

www.handgear.com

👍 smooth navigation • easy ordering • good return policy

Handgear offers a small selection of Palm hardware, plus other mobile-computing accessories and software.

insight.com

👍 separate sites for the U.S., Canada, Germany, and the U.K. • smooth navigation • easy ordering

With more than 100,000 items, **Insight** offers an impressive and easy-to-navigate catalog of hardware and software products. More than 100 free newsletters feature new-product news, closeout specials, and tech news.

www.jandr.com

👍 smooth navigation • easy ordering

Whether you're shopping for an Aptiva or an iMac, hardware and accessories abound at **J&R Computer World,** making this a one-stop shop for many. You'll also find a huge selection of digital and traditional film cameras.

laptoptravel.com

👍 smooth navigation

Laptop Travel sells portable-computing and international travel gear, including electrical adapters, modem converters and couplers, and security accessories. You'll find traditional and "camouflaged" laptop carrying cases, laptop RAM, and storage add-ons.

thelinuxstore.com

👍 smooth navigation

If your PC is "penguin-powered," **The Linux Store** might be your place to shop. The site offers a small selection

of hardware and software that's compatible with the popular alternative operating system. The community area offers Linux news, free downloads, and Web links.

mcglen.com

👍 smooth navigation • easy ordering

McGlen Micro's specialized searches can help you find memory and other accessories compatible with your computer, printer, and copier. Shoppers can design a custom system to be built and shipped in two days.

megahaus.com

👍 lifetime technical support on all products • CD-mastering and other utility software • smooth navigation

MegaHaus calls itself "the drive authority." It offers a wide variety of storage solutions, including hard drives, DVD drives, RAID, and removable storage. A technical-information area features FAQs and specifications on hardware ranging from DVD players to drive brackets.

mei-microcenter.com

👍 smooth navigation • good return policy

MEI-Micro Center offers new and refurbished desktops from Compaq, eMachines, Hewlett Packard, and PowerSpec. There's also a small selection of peripherals. Rummage around the bargain bin for deals on closeouts, refurbished units, and overstocks.

memman.com

👍 all memory carries a lifetime warranty • smooth navigation • good return policy

When it's time to upgrade the memory in your desktop or laptop, don't forget **Memory Man.** Besides memory chips, the site sells processors, motherboards, hard drives, heat sinks, and batteries for many types of notebooks.

memory4less.com

👍 company tests all products shipped • smooth navigation

Memory4Less offers low prices on a wide variety of RAM, including older, hard-to-find types. If you don't know the memory requirements of your computer or digital camera, it will tell you.

The site also sells CPUs, motherboards, and laptop hard drives.

microx-press.com

👍 smooth navigation • easy ordering

MicroX-Press offers detailed information about most products, as well as a handy "E-mail me when this product is priced at…" feature and a configuration tool. Customers are invited to rate and review products they've tried.

www.mobile-mania.com

👍 smooth navigation • good return policy

Digital cameras, e-mail devices, PDAs, cases, and adapters of all sorts are available for folks on the go at **Mobile Mania.**

mobileplanet.com

👍 smooth navigation • easy ordering

Offering gadgets for mobile professionals, **MobilePlanet** is home to a gaggle of high-tech tools and toys. The selection includes handheld and notebook computers, PDAs, wireless communication products, and travel-size printers and scanners—plus countless accessories for each.

motherboards.com

With a wide selection of motherboards from nine manufacturers, do-it-yourselfers can pick the perfect innards for their new PCs at **Motherboards.com.** This Web store offers CPUs, memory, graphics cards, drives, and other internal essentials.

www.mwave.com

👍 smooth navigation • easy ordering

Multiwave Direct's friendly site sells a multitude of hardware and software products. In addition to PC systems and peripherals, this Web store stocks notebook accessories, videoconferencing equipment, and network tools.

www.necx.com

👍 smooth navigation • easy ordering
👎 $25 surcharge for phone orders

NECX offers all manner of hardware,

accessories, and software. The Showcases section highlights products in specialty categories, such as PDAs or USB peripherals. The How to Buy guides offer impartial advice on selecting and installing common PC add-ons.

neutronet.com

👍 purchases earn credit points toward your next order • smooth navigation • easy ordering

Neutron Computers carries thousands of computer systems and peripherals from nearly 400 different manufacturers and distributors. The site's handy toolbox offers easy access to best buys, help for first-time buyers, and a massive manufacturer directory.

www.notebooksuperstore.com

👍 devoted exclusively to portable computers • easy ordering

Notebook Superstore sells more than 90 different laptop models from eight manufacturers. You'll see technical details about each model, and a comparison tool helps you zero in on the best portable for your needs. Corporate accounts receive lease options and volume discounts.

Notebook Superstore

123cdc.com
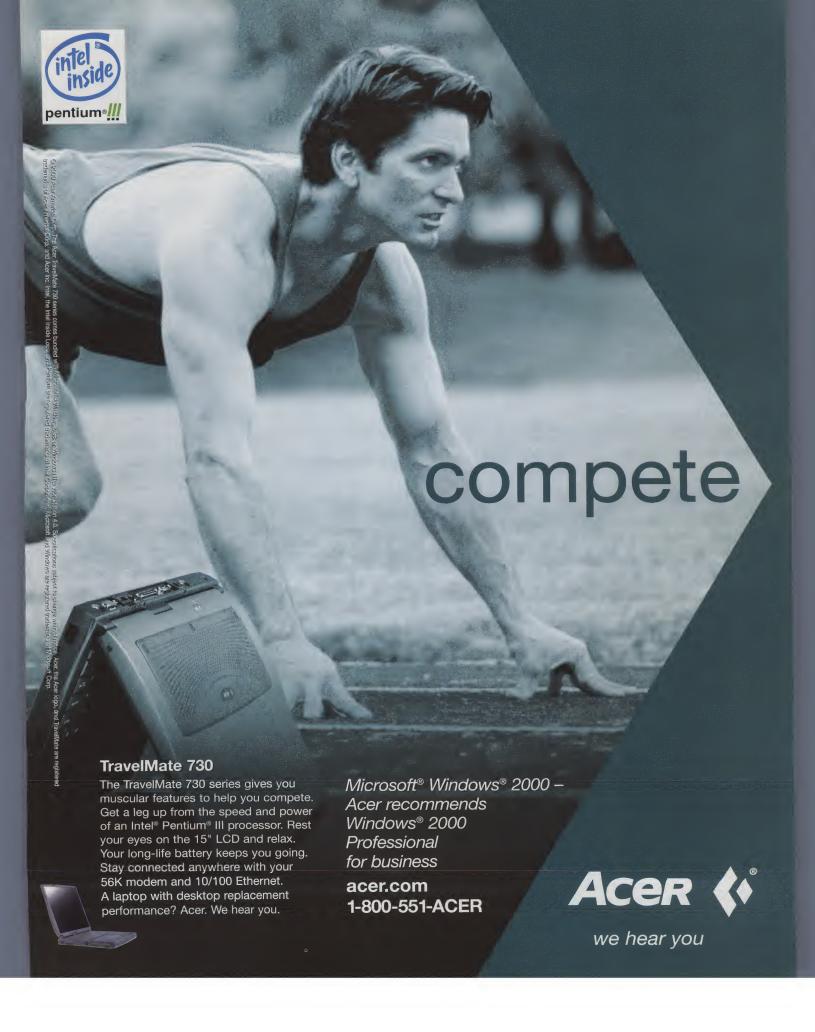
👍 smooth navigation • easy ordering

Computer Discount Center offers a wide variety of PC add-ons, including storage, digital cameras, and displays. Shoppers will find competitive prices and detailed product information.

officedepot.com

👍 free next-day delivery on orders of more than $50 within local trading areas • smooth navigation • easy ordering • good return policy

Office Depot sells everything for the office: file folders to filing cabinets, briefcases to bookcases. The site's computer category offers a selection of prebuilt machines from major

compete

TravelMate 730

The TravelMate 730 series gives you muscular features to help you compete. Get a leg up from the speed and power of an Intel® Pentium® III processor. Rest your eyes on the 15" LCD and relax. Your long-life battery keeps you going. Stay connected anywhere with your 56K modem and 10/100 Ethernet. A laptop with desktop replacement performance? Acer. We hear you.

Microsoft® Windows® 2000 –
Acer recommends
Windows® 2000
Professional
for business

acer.com
1-800-551-ACER

ACER ◆

we hear you

manufacturers. Office Depot provides free downloadable business forms, letter templates, and spreadsheet templates.

www.officemax.com

Best Site winner this month. See p. 180.

onvia.com

Best Site winner this month. See p. 181.

outpost.com

Best Site winner this month. See below.

www.palmgear.com

👍 mailing lists offer news, specials, and user tips • smooth navigation

Palm-device users will appreciate the extensive selection of free and commercial downloadable programs at **PalmGear H.Q.** The site features lists of the newest Palm programs, as well as essential software picks. Shoppers can buy handheld hardware and accessories, including carrying cases and styli.

www.thepartsfinder.com

👍 smooth navigation
👎 minimum $75 order

A friendly site that uses a graphical interface to simplify finding CPU fans, power supplies, cables, and screws, **The Parts Finder** is targeted at computer hobbyists and corporate buyers. Even the most mundane parts, such as bezels, fans, and batteries, are listed.

pcconnection.com

👍 smooth navigation • easy ordering

In business for more than 15 years, **PC Connection** offers good deals on a colossal variety of products. Smart Selectors ease the searching process for shoppers looking for systems, cameras, printers, monitors, or memory to fit specific guidelines.

pcmall.com

👍 free lifetime technical support • smooth navigation • easy ordering

SITE REVIEWS

Many folks are familiar with **PC Mall's** thick, colorful catalog, and the online version is just as dense. PC Mall has a vast selection of computers, hardware, and software.

pcprogress.com

👍 smooth navigation

If you're in the market for PC components and peripherals, check out **PC Progress.** The site specializes in cost-effective memory, with a lifetime warranty. You'll find a large selection of memory, including notebook, iMac, and printer RAM.

pcstop.com

This purveyor of hardware and software offers 50,000 computer-related products from 1,300 manufacturers. **PC Stop's** unusual interface makes shoppers start with a search—you can't just browse.

pcwonders.com

👍 corporate and educational accounts available • smooth navigation • easy ordering

At **pcWonders.com,** you'll find more than 90,000 hardware and software products. Additional categories include car audio, home electronics, PDAs, and bargain blowouts.

pczone.com

👍 printable rebate coupons • smooth navigation • easy ordering
👎 handling fee on smaller orders

PC Zone boasts an impressive product selection of all things PC-related, including desktops, notebooks, printers, monitors, storage devices, CPU upgrades, and network equipment—plus PDAs, digital cameras, and handheld MP3 players. You'll also find links to a clearance area and other stores: **Mac Zone** and **Zones Business Solutions.**

provantage.com

👍 smooth navigation • easy ordering • good return policy

Provantage offers PC products from more than 1,000 manufacturers. The selection includes software, hardware, books, and training materials. The site's

Personal Tracking List feature lets customers build a list of product bookmarks, then monitor the products' prices and availability.

www.qualityclick.com

👍 leasing options • easy ordering • good return policy

The **Quality Click** Web store covers all the basics for the PC user, including hardware, networking supplies, accessories, and software. Technical support is available through a toll-free phone number, fax, or e-mail, and there is sales support over live chat.

shopper.cnet.com

The **CNET Shopper** search engine takes the guesswork out of finding a deal on hardware, software, and accessories. The site tracks the prices of more than 200,000 products in 100 stores.

shoppingplanet.com

👍 smooth navigation

Do-it-yourselfers will appreciate **Shopping Planet's** inventory of barebones systems, add-on cards, and kits. An arm of the site that specializes in software and hardware for the Linux operating system is available at *shoppingplanet.com/cm/linux.asp.*

www.sparco.com

👍 smooth navigation • easy ordering

Sparco's catalog of more than 130,000 products makes it simple to shop for computer equipment. Looking for that something extra? Check out the list of products that come bundled with "free stuff."

www.spidergear.com

Spider Gear offers new and refurbished computers, cameras, home audio and video products, car-audio

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outpost.com

The breadth of products at **Outpost.com** will impress. For instance, the site sells a wide selection of computer hardware and software, personal electronics, and office products. The selection of PCs includes preconfigured desktop and notebook computers from Acer, Apple, Compaq, and other major manufacturers. A full complement of peripherals, accessories, and software is also available.

The Innovations area offers home and garden, health and fitness, travel, and auto products. In the Games section you'll find playtime activities for PC, Mac, and console gamers. Under the Electronics tab are home audio and video products, camcorders, phones, and portable electronics. The Cameras section peddles traditional and digital cameras, telescopes, and digital-imaging products.

Regardless of what you're shopping for, you'll enjoy a detailed description of each item that includes features, system requirements, and images. And Outpost.com does more than present itself well: It works hard to earn customer satisfaction with policies like a 30-day money-back guarantee and free overnight delivery.

We placed an order one Friday afternoon and were greeted the very next day by an Airborne Express truck delivering the goods. For those in a big hurry, Outpost offers same-day delivery in selected areas, but you'll have to pay for it.

Best Site Award — October 2000

OUTPOST.COM	
Main focus: Computers and software	
Additional categories: Electronics, cameras, business products	
Number of products offered: 170,000	
Areas of development: Site to offer custom-configured Micron PCs	

intel inside
pentium® *III*

Best Buy Award — Computer Shopper

flexibility

Functionality **Modularity** **Videoconferencing**

*ESP from
$2299

On the road you must be prepared for anything. Get equipped with Acer's TravelMate 600. Its hot-swappable modular bay comes standard with a 4X/4X/20X CD-RW and supports everything from a 6X DVD-ROM to a second HDD. Want desktop flexibility from a thin and light notebook? Acer. We hear you.

TravelMate 600

- Pentium® III processor up to 700MHz featuring Intel® SpeedStep™ technology*
- Disk anti-shock protection system
- 13.3" XGA TFT with 8MB video
- 4.72 lbs. with weight saver module

Microsoft® Windows® 2000 — Acer recommends Windows® 2000 Professional for business
acer.com   1-800-551-ACER

ACeR
we hear you

items, and appliances. A $10 optional membership entitles you to reduced prices, an annual rebate, and advance notice of new products.

Spider Gear

www.ssdonline.com

👍 the E-list service stores your product preferences • smooth navigation

At **State Street Direct's** Web store, shoppers will discover a huge selection of consumer electronics in addition to computers and imaging products. Digital photographers will find many items of interest.

State Street Direct

staples.com

👍 peruse your history of past purchases, even months later • liberal price-matching policy • smooth navigation • good return policy

Even if a **Staples** store is just down the block, you might prefer this elegant Web site when shopping for computer accessories, software, and office supplies. If you order similar items often,

Staples

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you can set up personalized lists to avoid filling out a new form every time.

2for1inkjet.com

👍 free shipping on orders of six or more items, or at least $200 • smooth navigation • good return policy

If your printer is putting you in the poorhouse, pay a visit to **2 For 1 Inkjet,** where you'll find two-for-one supplies for every brand of inkjet and laser printer, copier, and fax machine.

3re.com

👍 smooth navigation • easy ordering • good return policy

Specializing in used computers and rebuilt electronic equipment, **3Re.com** takes open-box returns from original equipment manufacturers and repairs and repackages the machines. Offerings include desktops, notebooks, printers, monitors, network equipment, and software.

tccomputers.com

👍 smooth navigation • easy ordering

In business since 1988, **TC Computers** sells fully configured systems, motherboards, and name-brand peripherals. The company's specialty is motherboards—it tests each one prior to shipping and bundles a step-by-step installation video.

tcwo.com

👍 smooth navigation • good return policy

Thompson's Computer Warehouse Outlet Center offers "wholesale computer parts to the public." The selection is small—you may find only a dozen monitors or four CD-ROM drives—but the prices are fantastic. Browse the selection or print out a complete price sheet for easy reference.

techstore.com

👍 smooth navigation • easy ordering

TechStore offers hardware in dozens of categories, ranging from CPU upgrades to storage devices. The site also offers a wide range of software—everything from Microsoft applications to children's titles.

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thortek.com

👍 smooth navigation

An array of computer accessories awaits **ThorTek** shoppers, including hard drives, notebook upgrades, peripherals, and software.

tigerdirect.com

👍 smooth navigation • easy ordering

TigerDirect's site offers custom-built computers, tested and shipped within 48 hours. Shoppers in the mood for an adventure can order a build-it-yourself custom PC kit.

trudata.com

👍 library of useful free software downloads • smooth navigation

True Data Technology's selection spans desktops, laptops, and palmtops, with an exceptional catalog of motherboards, hard drives, and other upgrade accessories. The site also features communication essentials for businesses, including DSL equipment and telephony products.

www.usbstuff.com

Looking for gadgets to plug into your new Universal Serial Bus-equipped computer? **USB Stuff** has it all, including digital cameras, CD-RW drives, printers, modems, hubs, input devices, cables, and adapters. A sister site at *www.firewirestuff.com* stocks IEEE 1394/FireWire-compatible hardware.

usedcomputer.com

👍 index of nonprofit organizations accepting computer donations

Used Computer Mall is a marketplace

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for used computer equipment. Shoppers can list hardware to sell or look for items to buy using the free classified ads. The site can also help you appraise equipment.

warehouse.com

👍 smooth navigation • easy ordering

The five "warehouses" under **MicroWarehouse's** roof sell PC hardware and software, Mac products, networking components, and supplies. The site provides corporate, educational, and government accounts. Business leases are available.

PC DIRECT VENDORS

axissys.com

The **Axis Systems** Web store offers a best-price guarantee on its preconfigured notebooks, servers, desktops, and workstations.

buyabs.com

👍 systems available with Linux preinstalled • smooth navigation • good return policy

Offering exceptional customer support on quality desktop and notebook systems is the goal at **ABS.** Shoppers can custom-configure a wide variety of PCs.

buy-atlas.com

👍 smooth navigation • good return policy
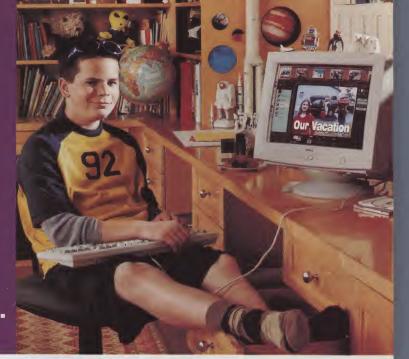
The **Atlas Micro** site sells a variety of preconfigured desktop PCs. Buyers can select from computers built around Pentium III, Celeron, and AMD processors.

cybermaxpc.com

👍 downloadable drivers and online tech guide • smooth navigation • good return policy

CyberMax offers AMD- and Intel-based systems in a wide variety of configurations to suit almost every need. The

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build your own computer.

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Build your dream machine from start to finish by including any of the features you choose.

With over 30 million potential configurations, you should have enough options to find exactly what you need for your system. And leave out exactly what you don't. Then again, with all of the latest and greatest technology at your fingertips, you may not want to leave out very much at all. Dell™ offers up to 1GHz of processing power on select Dimension™ desktops, or up to 750MHz on Inspiron™ notebooks, allowing you to cruise at any speed you'd like. And maximizing productivity will be a breeze with up to 75GB[5] of hard drive space on Dimension desktops. Find out more about all of this and our award-winning service and support options at www.dell4me.com. And you didn't even have to break a sweat, did you?

Dell™ Inspiron™ 5000e

DELL™ NOTEBOOKS:

DELL™ INSPIRON™ 3800

Design and Affordability

- Intel® Celeron™ Processor at 500MHz
- 12.1" SVGA TFT Display
- 32MB 100MHz SDRAM
- 4.8GB[5] Ultra ATA Hard Drive
- Modular 24X Max CD-ROM
- 2X AGP 8MB ATI RAGE Mobility™-M1 3D® Video
- 26.5WHr Li-Ion Battery with ExpressCharge™ Technology
- MS® Works Suite 2000 ▪ MS® Windows® Me[39]
- 1-Yr Limited Warranty[2]
- 1-Yr Next-Business-Day On-site Service[4]

$1399 E·VALUE CODE 05867-800913

As low as $38/Mo., for 48 Mos.[17]

DELL™ INSPIRON™ 5000e

Performance and Mobility

- Intel® Pentium® III Processor at 700MHz Featuring Intel® SpeedStep™ Technology
- 15" Ultra XGA TFT Display
- 64MB 100MHz SDRAM
- 5GB[5] Ultra ATA Hard Drive
- Modular Removable 8X Max DVD-ROM Drive
- 2X AGP 16MB ATI RAGE Mobility™ 128 3D® Video
- 59WHr Li-Ion Battery
- Internal V.90 56K Capable[6] FaxModem
- MS® Works Suite 2000 ▪ MS® Windows® Me[39]
- 3-Yr Limited Warranty[2]
- 3-Yr Next-Business-Day On-site Service[4]

$2749 E·VALUE CODE 05867-800927a

As low as $75/Mo., for 48 Mos.[17]

DELL™ INSPIRON™ 7500

Mobile Desktop

- Intel® Pentium® III Processor at 750MHz Featuring Intel® SpeedStep™ Technology
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- 2X AGP 8MB ATI RAGE Mobility™-P 3D® Video
- 79WHr Li-Ion Battery
- Internal V.90 56K Capable[6] FaxModem
- MS® Works Suite 2000 ▪ MS® Windows® Me[39]
- 3-Yr Limited Warranty[2]
- 3-Yr Next-Business-Day On-site Service[4]

$3199 E·VALUE CODE 05867-800931a

As low as $87/Mo., for 48 Mos.[17]

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DELL™ DIMENSION™ L Series

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- Intel® Celeron™ Processor at 566MHz
- 64MB SDRAM
- 7.5GB⁵ Ultra ATA Hard Drive
- 15" (13.8" vis) E551 Monitor
- Intel® 3D® AGP Graphics
- 48X Max CD-ROM Drive
- SoundBlaster 64V PCI LC Sound Card
- PC Speakers
- MS® Works Suite 2000 ■ MS® Windows® Me³⁹
- 3-Yr Limited Warranty² ■ 1-Yr At-Home Service⁴

$849 E·VALUE CODE
05867-500908a

As low as $23/Mo., for 48 Mos.¹⁷

DELL™ DIMENSION™ L Series

Affordable Desktop Solution

- Intel® Pentium® III Processor at 733MHz
- 64MB SDRAM
- 7.5GB⁵ Ultra ATA Hard Drive
- 15" (13.8" vis) E551 Monitor
- Intel® 3D® AGP Graphics
- 48X Max CD-ROM Drive
- SoundBlaster 64V PCI LC Sound Card
- PC Speakers
- MS® Works Suite 2000 ■ MS® Windows® Me³⁹
- 3-Yr Limited Warranty² ■ 1-Yr At-Home Service⁴

$899 E·VALUE CODE
05867-500908b

As low as $25/Mo., for 48 Mos.¹⁷

DELL™ DIMENSION™ 4100 Series

Advanced Performance, Smart Value

- Intel® Pentium® III Processor at 866MHz
- 128MB SDRAM at 133MHz
- 20GB⁵ Ultra ATA Hard Drive
- 17" (16.0" vis, .26dp) M781 Monitor
- 32MB NVIDIA TNT2 M64 4X AGP Graphics
- 12X Max DVD-ROM Drive
- SB Live! Value Digital
- Altec Lansing® ACS-340™ Speakers with Subwoofer
- V.90 56K Capable⁶ PCI Telephony Modem for Windows®
- MS® Works Suite 2000 ■ MS® Windows® Me³⁹
- 3-Yr Limited Warranty² ■ 1-Yr At-Home Service⁴

$1599 E·VALUE CODE
05867-500915y

As low as $44/Mo., for 48 Mos.¹⁷

DELL™ DIMENSION™ XPS B Series

Cutting-Edge Technology

- Intel® Pentium® III Processor at 1GHz
- 128MB RDRAM ■ 30GB⁵ Ultra ATA Hard Drive
- 19" (17.9" vis, .24 - .25AG) P991 FD Trinitron® Monitor
- NEW 32MB DDR NVIDIA GeForce2 GTS 4X AGP Graphics Card
- 12X Max DVD-ROM Drive
- SB Live! Value Digital
- Harman Kardon HK-595 Surround Sound Speakers with Subwoofer
- V.90 56K Capable⁶ PCI Telephony Modem for Windows®
- MS® Works Suite 2000 ■ MS® Windows® Me³⁹
- 3-Yr Limited Warranty² ■ 1-Yr At-Home Service⁴

$2499 E·VALUE CODE
05867-500924y

As low as $68/Mo., for 48 Mos.¹⁷

DELL™ UPGRADES:

SOFTWARE & PERIPHERALS

Printers:
- HP® DeskJet® 952C – $249 after $50 HP® Mail-In Rebate (Reg. $299)³⁸
- HP® DeskJet® 932C, add $199
- Epson® Stylus Color 740 , add $99

Scanners:
- HP® ScanJet® 5300C, add $199 after $50 HP® Mail-In Rebate (Reg. $249)³⁸
- HP® ScanJet® 4300, add $149
- UMAX® Astra® 2100U, add $89

Power Protection:
- Pro 8T2 SurgeArrest, add $39

Software:
- Ultimate Sports Pack Plus (Dimension™ only)¹⁶, add $99
- Home Reference 4-pack¹⁶, add $79

SERVICES

Internet Service:
- 1-Yr Dellnet™ Internet Access¹⁰ with 20MB of Online Backup¹², add $99

Service Upgrades:
- Dell™ Dimension™ Premier 3-Yr At-Home Service⁴, add $99
- Dell™ Inspiron™ 3800 Notebook 3-Yr Next-Business-Day On-site Service⁴, add $149

Payment Solutions:
- Dell™ 48-Month Purchase Plan¹⁷
- Dell™ E-Check (Automatic Checking Withdrawal)

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[that should make your buying decision very, very, very, very, very, very, very, very, very, very, very, very, very, very, very, very easy.]

DELL™ DIMENSION™ 4100 Series

Advanced Performance, Smart Value

- Intel® Pentium® III Processor at 800MHz
- 128MB SDRAM at 133MHz
- 20GB⁵ Ultra ATA Hard Drive
- 17" (16.0" vis, .28dp) E770 Monitor
- 16MB ATI RAGE™ 128 Pro
- 48X Max CD-ROM Drive
- SB Live! Value Digital
- harman/kardon Speakers
- V.90 56K Capable⁶ PCI Telephony Modem for Windows®
- MS® Works Suite 2000 ■ MS® Windows® Me³⁹
- 3-Yr Limited Warranty² ■ 1-Yr At-Home Service⁴

$1299 ⊘ **E·VALUE CODE** 05868-500912y

DELL RECOMMENDED UPGRADES:
- Premier 3-Yr At-Home Service⁴, add $99
- Harman Kardon HK-595 Surround Sound Speakers with Subwoofer, add $80

Dell™ PCs. Powerful. Reliable. And winner of the most service and support awards in 1999.

Buying a PC can be nerve-racking. You worry about getting one that comes with the software you want, the power you need, and the service you can't live without. Buying a Dell™ can help. Our computers are personalized by you, and backed by our award-winning service. In 1999 alone, we won more service and support awards than any other computer manufacturer. How? By offering you 24-hour/365 day-a-year online and over-the-phone support for the life of your computer. We even offer at-home service⁴ during the first year, if we can't solve your problem online or by phone. Around-the-clock, go-anywhere-to-fix-your-computer service and support, is just one more way Dell4me™ is helping you get the most out of your PC. And a better night's sleep.

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SITE REVIEWS

choices range from speedy desktop machines for gamers to light laptops for business travelers.

CyberMax

cyberpowerinc.com

👍 downloadable drivers • smooth navigation • good return policy

From the Transparent Dream to the Lightning Professional, the computers at **CyberPower** have names as good as their warranties—three years, with a 30-day money-back guarantee.

CyberPower

dell.com

👍 online technical support customized for your particular system • smooth navigation • easy ordering • good return policy

Carrying the online banner for one of the largest names in direct PC sales, **Dell** specializes in built-to-order desktop and notebook PCs. The site offers detailed specs, an online tour of each product, and copious customization options.

Dell

www.directplus.compaq.com

👍 smooth navigation • easy ordering

Compaq DirectPlus carries desktops, portables, workstations, and servers. The Compaq Factory Outlet at **www.compaqworks.com** offers discounts on refurbished and new overstocked merchandise.

fpcdirect.fujitsu-pc.com

👍 smooth navigation • good return policy

Purchase **Fujitsu** notebook computers from the source. This Web site offers personal, business, and multimedia notebook computers, with several warranty options on each. Check the Refurbished Outlet for deals.

www.gateway.com

👍 smooth navigation • easy ordering • good return policy

One of the biggest names in online computer sales, **Gateway** serves small businesses, corporations, educational institutions, government bodies, and home users. Its site sells desktops, portables, and a complete line of accessories.

ibm.com/shop

👍 Linux available on laptop models • smooth navigation • easy ordering • good return policy

Once synonymous with the phrase "personal computer," **IBM** still pushes the envelope. Its site offers business and home computers, notebooks, servers, thin clients, and the networking equipment to hook them all together.

kaypro.com

👍 smooth navigation

Kaypro's first computer, released in the early '80s, used a Z-80 processor and ran the long-forgotten CP/M operating system. Today, the company's Web site sells decidedly more modern desktop computers, allowing shoppers to custom-configure Pentium III systems.

micronpc.com

👍 smooth navigation • good return policy

One of the largest direct PC vendors, **micronpc.com** has a Web sales site broken into clear areas to suit many types of customers, including home-office users, large businesses, government buyers, and buyers outside the United States.

nutrend.com

👍 smooth navigation • good return policy

Custom-configure a home or business PC at **NuTrend.** The company offers a wide selection of desktop machines running your choice of Intel or AMD processors. Each system comes with a three-year warranty.

www.quantex.com

👍 smooth navigation

Desktops, notebooks, servers, workstations, and peripherals—all are offered at **Quantex's** Web store. A community area allows Quantex PC users to keep in touch.

sagernotebook.com

👍 leasing options available • smooth navigation • good return policy

Specializing in portable computers, **Sager** offers a variety of notebook-computing options, from budget-minded machines to speedy multimedia units. The one-year warranty includes a 72-hour repair-turnaround guarantee.

shopacer.com

👍 smooth navigation • easy ordering

Notebooks, desktops, and accessories are for sale at **Acer's** site, in addition to ready-to-use PC bundles for home, business, and education.

shopprostar.com

👍 downloadable drivers • smooth navigation • good return policy

Each computer in **ProStar's** line of notebook PCs is backed by a 30-day money-back guarantee, a speedy repair promise, and free tech support.

store.apple.com

👍 smooth navigation • easy ordering

Apple's easy-to-use online store allows buyers to custom-configure the company's Power Mac G4, PowerBook, iMac, and iBook computers. A wide array of Mac-compatible software and accessories is also available.

Apple

tiny.com

👍 smooth navigation

Leading British PC maker **Tiny Computers** has joined the U.S. market. The company's line of prebuilt PCs ranges from beginner to professional models.

Tiny Computers

vaiodirect.sel.sony.com

👍 smooth navigation • good return policy

VAIO Direct sells Sony's line of desktops, notebooks, digital cameras, displays, and storage devices. The Xtras Direct arm offers add-ons for PCs, digital cameras, and other equipment.

www.winbook.com

👍 smooth navigation • good return policy

Focusing exclusively on notebook computers, **WinBook** offers machines with a 30-day money-back guarantee, a one-year warranty, and free technical support.

INTERNET SERVICE PROVIDERS

www.att.net

AT&T WorldNet offers 450 local access numbers. The standard pricing plan is $19.95 per month for 150 hours of access. For $2 more, power users can get unlimited access. Families and Websmiths will appreciate the whopping 60MB of Web-page space and six e-mail addresses.

AT&T WorldNet

compuserve.com

Owned by America Online, **CompuServe** is aimed at professionals and is more powerful than AOL. Access is $9.95 per month for 20 hours, or $19.95 for unlimited access. Customers get seven e-mail addresses and 5MB of Web-page space.

csg.sprint.com/internet

Unlimited access to **Sprint EarthLink** costs $19.95 a month ($2 less if you are a Sprint long-distance customer). The service provides 6MB of Web-page space and an impressive 1,400 local access phone numbers nationwide.

Sprint EarthLink

free.msn.com

Displaying a recently revamped interface, **MSN Internet Access** costs $21.95 per month for unlimited access, and the first month is free. You'll also find more than 800 U.S. and international access numbers. The service is not available for Mac users. MSN provides 12MB for Web pages.

www.mciworld.com

MCI WorldCom offers more than 750 local access numbers across the United States. It costs $19.95 for up to 150 hours of access each month ($3 less if you are an MCI long-distance customer). Additional online time is 99 cents an hour.

www.newaol.com

Known for its ease of use, **America Online** is the nation's most popular ISP. It offers many pricing plans, including one for $21.95 per month that gives unlimited access. Extras include members-only forums, 14MB of Web-page space, and seven e-mailboxes.

prodigy.com

A $19.95 monthly fee buys unlimited access to **Prodigy Internet.** Low-usage and deluxe-access plans are also available. Users get 6MB of Web-page space. Accounts come with only one e-mail address, but you can add 10 more for $2 extra.

FINANCIAL SERVICES

www.americancentury.com

👍 stock, bond, and option trading • retirement services • smooth navigation

Whether you're a conservative, moderate, or aggressive investor, **American Century** has a fund targeted to your needs.

ameritrade.com

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bondsonline.com

👍 daily bond-market commentary • daily pricing of U.S. Treasury securities

SITE REVIEWS

Bonds Online offers market information about tax-free municipal bonds, Treasury bonds, funds, and brokers. You can also buy software that will calculate the prices and yields of your bonds.

clearstation.com

👍 discussions about stocks and trading strategies • track an unlimited number of portfolios • smooth navigation

ClearStation is a financial-advisory Web site that helps investors make decisions by identifying and interpreting stock trends.

datek.com

👍 free real-time quotes • after-hours trading • smooth navigation

Investors can build their own portfolios at **Datek,** using online resources to make educated decisions. The commission for most online trades is $9.99.

www.edgar-online.com

👍 search the SEC database • historical data dating back to 1994 • smooth navigation

For up-to-date financial reports on companies, **Edgar Online** is a great place to start. Premium subscribers enjoy real-time SEC filings, insider transaction filings, and custom company watch lists.

etrade.com
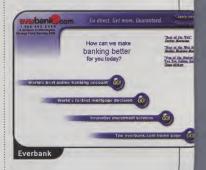
👍 community area offers discussion groups and online events • smooth navigation

ETrade investors can learn about companies, then build and manage their own stock portfolios. Amenities include free streaming NASDAQ Level II quotes, IPO allocations, and real-time updates.

everbank.com

👍 smooth navigation

Everbank offers free online banking services complete with interest-bearing checking accounts and a bill-pay feature. The site also offers Web-based mortgage, insurance, and investing tools.

Everbank

hoovers.com

👍 4,000 company profiles • upcoming IPOs featured • smooth navigation

Hoover's Online offers countless resources for financial research. Free tools include daily financial headlines and the Stock Screener.

ino.com

👍 option chains • free end-of-the-day updates by e-mail • smooth navigation

Devoted to futures, options, and equities trading, **Ino.com** offers a comprehensive site that includes daily financial

headlines, quotes and charts, and lively forums.

kiplinger.com

👍 forums let users ask questions and discuss financial topics • financial software and videos • smooth navigation

Kiplinger.com contains a vast array of financial information. Departments include taxes, insurance, investments, and home. Each area includes several articles and columns.

Kiplinger.com

schwab.com

👍 24-hour customer service by phone and e-mail • special services for high-volume traders

Online investors can get help planning for college, retirement, or a rainy day at **Charles Schwab.** This site offers myriad investing options, as well as research and planning services.

stockmaster.com

👍 create custom investment profiles • message boards for investment discussions • smooth navigation

StockMaster will tell you the trading price and details of any stock or investment fund, providing instant graphs of that stock's activity. A subscription service provides access to Baseline Company Profiles of more than 8,000 companies.

wallstreetcity.com

👍 intuitive explanations of stock trends • free 30-day trial

Wall Street City's free services include quotes and graphs, real-time market commentary, and analyst reviews. Paying a monthly subscription fee adds real-time quotes, access to historical pricing data, and portfolio monitoring.

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waterhouse.com

👍 offers checking accounts with electronic bill payment

At **TD Waterhouse's** Web site, the money-minded will find brokerage, banking, and mutual-fund services. Waterhouse makes company news, reports, and charts freely available to investors with inquiring minds. Online stock trading costs a flat $12 per transaction.

windowonwallstreet.com

WindowOnWallStreet.com offers professional-level stock trading services, including real-time quotes, dynamically updated charts, real-time option chains, and news. The service costs $79.95 per month and requires you to install a desktop Internet client.

wingspanbank.com

👍 smooth navigation

One of the new breed of Internet banks, **WingspanBank.com** offers a full range of banking, loan, brokerage, and insurance services. Convenient banking options include interest-bearing checking accounts with direct deposit, as well as online bill-payment services.

www.wsrn.com

👍 stock screener • links to publications on economy, equity, and markets

Wall Street Research Net offers thousands of links to help professional and private investors perform research on companies and mutual funds, as well as locate important economic data. Brokerage reports and historical stock-price data are available for a fee.

PC RESOURCES

cablemodeminfo.com

👍 helps you find a cable-ready ISP

Internet addicts considering upgrading to a cable modem—as well as users who have already made the jump—will find a cornucopia of information at **Cablemodeminfo.com.** You'll find reviews of cable-modem hardware and tips on sharing a modem between PCs.

SITE REVIEWS

dailyedeals.com

👍 smooth navigation

Before you place an order at your favorite e-commerce site, open a window to **DailyeDeals.** Its coupon pages offer coupon codes that will instantly shave $5 to $20 off the bottom line at major online retailers. The First Time area links to sites that offer substantial discounts to first-time customers.

dcresource.com

👍 message board • links to digital-camera stores

The **Digital Camera Resource Page** is an unbiased, comprehensive source of information for digital-camera buyers and owners. Shoppers will enjoy the FAQ page, buyer's guide, and reviews.

dealtime.com

👍 DealTime Mobile service lets you compare prices from a cell phone or Palm device • smooth navigation

DealTime is an independent comparison-shopping service that helps you decide where to buy online. The site aggregates prices from hundreds of merchants, auctions, and classified sites.

www.expertcity.com

👍 smooth navigation
👎 currently no support for Mac or Unix operating systems

Expertcity promises live, 24-hour computer assistance from real human beings. When you pose a question, experts across the Internet bid for your business. Read their profiles, compare prices, then choose the expert you like.

56k.com

👍 downloads of the latest modem firmware • smooth navigation

Don't buy a new modem until you've visited **56K Modem Central.** Start with the primer on 56Kbps modems, learn the difference between technologies, then use the price shopper to find a model at the best price.

56K Modem Central

www.ftc.gov

👍 smooth navigation

The **Federal Trade Commission's** Web site is packed with useful information for consumers. The content covers the spectrum of consumer fraud and how to avoid it—online and offline. Articles address online auctions and protecting yourself when shopping on the Net.

SITE REVIEWS

gomez.com

👍 smooth navigation

Gomez.com offers ratings and customer reviews of e-commerce sites in two dozen categories, ranging from Web-based computer stores to drugstores, apparel shopping to online brokers. Read other customers' reviews and check their ratings on ease of use, customer confidence, and cost.

Gomez.com

help-site.com

👍 links to 1,000 documents
• smooth navigation

Help-Site is a great place to find FAQ lists, tutorials, manuals, and official as well as unofficial support. You'll find documentation on DOS, Windows, OS/2, and even Unix and VAX/VMS systems.

helptalk.com

👍 smooth navigation

Helptalk offers free assistance for most Windows software and hardware. The site offers 30 message boards where you can ask questions about applications, operating systems, and programming.

modemhelp.com

👍 smooth navigation

ModemHelp provides technical support for modem users and a hearty list of

ModemHelp

links to other modem-related sites. You'll find information on upgrading modems, diagnostic tools, tutorials, and discussion forums.

nextag.com

👍 product reviews available
• smooth navigation

NexTag is a sophisticated buying service that can help frugal shoppers find the lowest possible prices on computer equipment, electronics, books, music, and videos. Entering your ZIP code allows NexTag to calculate shipping and tax for accurate pricing.

productreviewnet.com

👍 smooth navigation

Product ReviewNet collects abstracts of all sorts of products, including computers, appliances, sports equipment, and automobiles. Each abstract includes a citation (for magazine articles) or a link (for online reviews). The site includes a handy list of online buying guides.

www.thepubliceye.com

👍 customer-satisfaction database
• smooth navigation

Find Internet businesses that deliver the best service—and avoid the ones that don't—with **ePublicEye.com,** a customer-service rating site. The site uses secret shoppers who patronize Internet businesses, conducting audits and rating the service of each business.

rammatters.com

💬 Flash 4 plug-in required for maximum effects

RAM Matters humorously explains how adding memory to your computer will make you more productive, and, so the site claims, better-looking. You'll get help in determining the type of memory your computer requires, plus installation tips.

www.scambusters.com

👍 information on viruses—real and fake

Internet ScamBusters is a site and a newsletter aiming to help Net users avoid getting cheated. Each newsletter focuses on a single type of scam, ranging from the merely annoying to the downright dangerous. Scams that target online shoppers are also covered.

usb.org

👍 message board fields questions
• smooth navigation

Check this site for technical information about the **Universal Serial Bus,** as well as answers to frequently asked questions and information about devices that use the bus. There's information for end users as well as developers.

windrivers.com

👍 smooth navigation

WinDrivers.com is a comprehensive archive of drivers and DLL files for hard drives, sound cards, scanners, and other hardware. The site also provides links to antivirus updates and BIOS upgrades.

www.worldowindows.com

👍 hundreds of downloadable drivers
• smooth navigation

World O' Windows is a collection of useful news, resources, and tips about

current and future versions of Microsoft Windows. Information and user tips abound. The site can be invaluable if you're considering upgrading or if your recent upgrade is causing problems.

World O' Windows

SOFTWARE SITES

accountingshop.com

👍 get credit for your old QuickBooks or Peachtree software when you upgrade • smooth navigation

The **Accounting Shop** Web store focuses on accounting software. Shoppers can choose from an extensive catalog of high-end, midrange, and small-business packages. Easy-to-understand charts let you compare

chumbo.com

If you're looking for a one-stop shop for software, visit **Chumbo.com**. It's stocked with an assortment of business and developer tools, utilities, graphics applications, games, children's software, and home and reference programs. In addition to tons of Windows and Mac programs, the site features a Linux Store area that sells applications for the popular alternative OS. You'll also find an array of DVD movies here, in categories ranging from animé to western.

A special calendar keeps you informed about upcoming software and DVD releases; you can preorder these items for shipment the day they are released. The Rebate Center features links to software with money-saving deals from the manufacturer. And if you're looking for a software gift, check the Staff Picks page, which offers suggestions from software experts—and their pets.

Our order was shipped via two-day FedEx for a nominal $3.95 shipping fee. The My Chumbo feature let us track the status of the order and review a complete order history.

CHUMBO.COM	
Main focus: Computer software	
Additional categories: DVD movies	
Number of products offered: 15,000	
Areas of development: Personalization features, product recommendations, and editorial content are planned.	

SITE REVIEWS

products by type, function, or price.

beyond.com

👍 smooth navigation • easy ordering • good return policy

Beyond.com presents a cornucopia of choices for PC, Mac, and PDA users. In addition to traditional boxed titles, the site sells downloadable software from major publishers. The site also offers a respectable selection of computer hardware, including digital cameras, PDAs, and storage devices.

buycheapsoftware.com

👍 smooth navigation • easy ordering • good return policy

The name says it all: Here you can **Buy Cheap Software.** This site offers a relatively small selection—about 300 titles—but it does sell popular programs from well-known publishers, including Adobe, Corel, Lotus, and Microsoft.

buyonet.com

👍 site available in six languages • software available in 20 languages • smooth navigation • easy ordering • good return policy

Buyonet specializes in downloadable commercial software. Hundreds of business applications, utilities, and games are available for download. For a nominal fee, shoppers can order a CD backup of purchased software.

chumbo.com

Best Site winner this month. See p. 194.

cws.internet.com

👍 free e-mail summary of software updates • smooth navigation

Stroud's Consummate Winsock Applications List is the ultimate one-stop download site for the latest and greatest in Internet software. Find and download Web development tools, browsers, and chat clients. You'll find comprehensive file lists, ratings, and extensive reviews.

dealdealdeal.com

👍 smooth navigation

Dealdealdeal offers office suites, utility software, graphics programs, operating systems, games, and edutainment software. Although the selection isn't massive, shoppers will find a nice mix of new software and older titles—handy, whether you're looking for Microsoft Office 2000 or Office 97.

download.com

👍 smooth navigation

When you're looking for shareware or free software, **Download.com** is a fine starting point. Well-written newsletters and down-to-earth reviews will help you find the perfect programs. The site links to tens of thousands of files of PC, Mac, Linux, Windows CE, and Palm software.

ebworld.com

👍 can search for age-appropriate games • lists release dates for new game titles • smooth navigation • easy ordering • good return policy

Electronics Boutique is a gamer's paradise. Here you'll find game software and add-ons for your PC and your Mac, as well as titles for Dreamcast, Nintendo 64, and other game consoles.

Check out the new releases, best-sellers, and gaming news.

freewarefiles.com

👍 smooth navigation

Windows users who want great software without having to spend any money can start at **Freeware Files.** This Web site offers links to gratis business applications, screen savers, games, and many other types of software. It features quick links to the most popular giveaways.

jumbo.com

👍 smooth navigation

Jumbo is the perfect name for this monstrous file archive. In addition to programs for sale, you'll find thousands of commercial-application demos, along with loads of shareware and free software.

mightyscholar.com

👍 smooth navigation • good return policy

It can be hard to find educational software that's right for your children's ages and learning needs. **Mighty Scholar** sells handpicked educational software, categorized by age range and subject.

999central.com

👍 buy seven programs, get one free • smooth navigation • good return policy

The **999central.com** site offers 500 programs, each for $9.99. Shoppers can find a wide variety of software here, although educational, entertainment, and lifestyle programs are the most common.

www.pdfstore.com

👍 smooth navigation • easy ordering

The **PDF Store** specializes in software for creating and working with Portable Document Format files. The site sells shareware and commercial software for immediate download. The selection includes PDF conversion, management, printing, and development software—a convenient, focused selection.

soft4u.com

👍 free shipping on orders over $300 • smooth navigation • easy ordering • good return policy

Soft4U specializes in software for businesses, resellers, schools, and government offices. The company offers same-day shipping on most software. Special prices are available for staff and students at academic institutions.

www.softwarebuyline.com

👍 free shipping on orders of more than $50 • smooth navigation • good return policy

Software BuyLine has a massive selection of software titles for Windows, Mac OS, and Linux. The site sells Windows CE and Palm applications, too. Prices here are usually among the best. You'll also get easy access to product rebate information.

tucows.com

👍 mirror sites speed downloads • smooth navigation

Bovine bliss: **Tucows** is an incredible archive of freeware and shareware. The category list and reviews make it easy to find the software you're seeking. In the Online Store, you can pay for, register, and download commercial software.

ONLINE AUCTIONS

auctions.cnet.com

👍 well-defined categories make items easy to locate • smooth navigation

At **CNET Auctions,** a site dedicated to computer-product auctions, you can bid on the hardware and software listed or put any computer items you'd like to sell on the block. Sellers range from individuals to well-known companies.

auctions.com

👍 smooth navigation

Auctions.com hosts user-to-user auctions in categories from stamps to pet supplies. The computer auction listings offer a respectable quantity of PC hardware and software.

auctions.goto.com

👍 trend-watch and message boards • smooth navigation

GoTo Auctions puts at your disposal a cross-auction search engine that hunts for items in 14 categories.

auctions.yahoo.com

👍 no charge to buy or sell • smooth navigation

Yahoo's user-to-user auction site offers hundreds of thousands of items in diverse categories ranging from computer hardware to motorcycles. Collector clubs, message boards, and live chat let sellers and buyers talk, ask questions, and trade items.

auctions.zdnet.com

👍 the Auction Agent will notify you when a new auction meets your criteria • smooth navigation

The auction site of **ZDNet,** *Computer Shopper's* parent company, offers primarily computer hardware and software. Categories include consumer electronics, gaming, domains, and services. You'll find user-to-user auctions, as well as new and used items offered by well-known businesses.

bid.com

The **Bid.com** business-to-user equipment auction site offers desktop and notebook computers, monitors, upgrades, cameras, and home electronics. Equipment may be new or refurbished.

ebay.com

👍 smooth navigation

With half a million new auctions every day, **eBay** is the Internet's most popular auction arena. The site is packed with unique services: All purchases are insured up to $200, and Billpoint lets even occasional sellers accept credit-card and electronic-check payments.

ewanted.com

👍 unique process • smooth navigation

"Turning auctions upside down" is the goal of **eWanted.** The site allows potential buyers to list the items they're looking for. Sellers can submit offers, bidding down the price to earn the business. Categories include computer equipment, antiques, baby items, and real estate.

haggle.com

👍 smooth navigation

Haggle.com is a user-to-user auction site that has nearly 40 computer-related categories, plus "other stuff" auctions ranging from musical instruments to automobiles. Sellers will appreciate the free basic listings.

itrack.com

👍 auction news area

Simple to use, **iTrack.com** searches online auctions so you don't have to. Free memberships allow you to select five patterns (combinations of an auction site and an item) at a given time; for $25 per year, you can search 10 patterns at a time; and for $50, 20 patterns at a time. You can choose from 14 auction sites.

tradeout.com

👍 smooth navigation

TradeOut.com describes itself as a "business-to-business exchange for excess inventory and idle assets." It helps companies buy and sell surplus goods—from computers to car parts to construction supplies. Most items are sold at auction, but others are available on a first-come, first-served basis.

ubid.com

👍 smooth navigation

UBid's business-to-user auction house offers computers, electronics, housewares, sports items, jewelry, and gifts. If you can't wait several days to learn if you've won, click on the Auctions Closing This Hour link.

SMALL-BUSINESS RESOURCES

atyouroffice.com

👍 free delivery on all orders of more than $25 • smooth navigation • easy ordering • good return policy

The impressive **AtYourOffice.com** site offers everything for the office, from the essential to the mundane—30,000 products in all. You can limit searches to products that are generic brands, eco-friendly, or manufactured by women- or minority-owned businesses.

businessplans.org

👍 links to franchise information, public-relations resources, market analysis, and other sites

The **Center for Business Planning** offers a library of real business plans that you can download and review offline, an automated tool that can evaluate your marketing strategy, and a massive collection of links of interest to anyone starting a business.

consultlink.com

👍 consultant reference checks available • smooth navigation

ConsultLink is a directory service that helps businesses find contractors and independent consultants in a wide variety of high-tech fields, such as technology strategy, programming, and technical writing. ConsultLink charges a fee to access each profile. A flat-fee option allows unlimited profile views.

directdeposit.com

Since 1991, **National Payment Corp.** has been providing direct-deposit services for small and medium-size businesses. Using a secure Web browser, you can submit payroll for direct deposit to your employees' bank accounts. The site can exchange data with more than two dozen accounting programs.

efax.com

👍 smooth navigation • easy ordering

The **eFax.com** site gives you a personal fax and voice-mail number and delivers incoming messages by e-mail. The free basic service lets you receive an unlimited number of faxes. For a monthly fee, eFax Plus lets you send faxes and convert incoming faxes to text.

e-stamp.com

👍 you don't have to be online to print postage
👎 buying postage *requires special* hardware

E-Stamp lets you buy postage over the Internet, then print that postage on your printer. You can use E-Stamp to send first-class, Priority Mail, Express Mail, and parcel-post items. The site sells envelopes, labels, postage scales, and other mailing supplies.

www.fedworld.gov/taxsear.htm

👍 smooth navigation • order federal tax information on CD-ROM

At **FedWorld** you'll find downloadable tax forms for tax years 1992 through 1999 and instructions on filling them
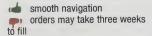
out, as well as IRS publications, tax tables, and tax regulations.

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iprint.com

👍 smooth navigation • easy ordering

With the help of **iPrint.com,** creating personalized items for business is a snap. Place your mark on stationery, rubber stamps, business cards, and sticky notepads, or create your own promotional items like key chains, T-shirts, and golf balls.

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officebase.com

👍 smooth navigation
👎 orders may take three weeks to fill

From office machines to snacks, this office-supply store sells just about anything you could need in the workplace. **Office Base** is simple but effective, making it easy to find products.

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onlinepayroll.com

Online Business Services will help any business become more efficient

and receive more than 80 financial reports. Online Payroll can receive payroll information by telephone, fax, modem, or direct link with your electronic time clock.

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paycheckcity.com

Paycheck City provides Web-based calculators to verify the accuracy of payroll checks. Employers can use the site to complete W-4 forms, and employees can verify what they should be paying in federal, state, and Social Security taxes. New tools include an hourly calculator, a bonus calculator, and a stock-option calculator.

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www.pointofsale.com

Pointofsale.com specializes in retail essentials: point-of-sale software and hardware, bar-code scanners, magnetic-stripe readers, and receipt printers. FAQs answer questions about bar codes, POS systems, and cash drawers.

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smartship.com

👍 helps find your nearest package drop-off site

SITE REVIEWS

👎 limited information about smaller carriers

SmartShip makes it easy to select the right carrier for your shipments. Enter the weight and other details about your package, and the site will help you choose the best major carrier, whether your priority is speed or cost.

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www.ssa.gov

👍 smooth navigation

The **Social Security Administration's** site can make the necessary task of paying Social Security understandable to small-business owners. The Guide for Employers offers detailed help with employer wage-filing responsibilities. The FAQ answers questions about documentation and filing deadlines.

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stamps.com

👍 no special hardware required
👎 must be online to print postage

Stamps.com lets customers buy postage online and print it using an inkjet or laser printer. You can send items first-class, Priority, and Express Mail. Delivery confirmation and certified mail are also available.

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usa.net

USA.net can set up a Web post office for your business, letting you and your employees have instant access to e-mail from any Web browser. The long list of standard and premium features includes necessities such as spell-checking and language translation.

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www.virtualpayroll.com

Virtual Payroll simplifies the cycle of payroll and taxes for small businesses. Through this secure site, company and employee information is entered to set up initial payroll accounts; with periodic updates, employees are paid by direct deposit within 48 hours.

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webex.com

👍 offers Web-based business collaboration
👎 requires a special plug-in

WebEx is an online collaboration system that hosts thousands of daily meetings. Share documents and applications with colleagues who have your meet-

ing-room password and the WebEx plug-in. Free "virtual offices" offer personalized conference rooms with online calendar, address-book, document-storage, and directory tools.

CONSUMER ELECTRONICS

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bestbuy.com

👍 smooth navigation • easy ordering • good return policy

Freshly restocked after a massive overhaul, **Best Buy's** site offers a fine selection of home audio and video components, portable audio gadgets, digital and traditional cameras, camcorders, and accessories.

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consumer-direct.com

👍 smooth navigation

Shopping for something simple, such as a surge protector? Or complicated, like a C-Band satellite receiver? Either way, **Consumer Direct Warehouse** provides a selection of brands to explore.

Consumer Direct Warehouse

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crutchfield.com

👍 smooth navigation • easy ordering • good return policy

In business for 26 years, **Crutchfield** assembles an impressive catalog of audio and video products for your home and car. Inexpensive two-day shipping is standard for most orders. The extensive Info Center offers glossaries, guides to choosing components, and installation tips.

800.com

👍 review your complete order history • smooth navigation • easy ordering • good return policy

The **800.com** site specializes in video and audio systems, personal

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hifi.com

Hifi.com has home-audio and home-theater products to please budget shoppers and discriminating audiophiles alike. The site also sells televisions, portable audio devices, DVD players, and movies. A series of unique features and policies set it apart from competing online consumer-electronics stores.

If the product you buy from Hifi.com is offered at a lower price at another major dealer within 30 days of your purchase, Hifi.com will automatically refund the difference. In addition, the site's bonus program lets you "trade in" your older home-theater equipment for new items: Auction off used equipment on eBay, and you'll receive a $50 credit to your Hifi.com account.

Optional extended warranties are offered on products, but with an unusual twist: If you buy an extended warranty and never use it, the company refunds 50 percent of what you paid for the warranty in the form of a store credit.

The Installation Support section of the site delivers detailed advice on installing components, placing speakers, and troubleshooting your new home-entertainment system. In addition, Hifi.com offers free shipping and a no-questions-asked 45-day return policy on most products. The company will even pay for return shipping.

Best Site Award — October 2000

HIFI.COM	
Main focus: Home theater, home audio, portable electronics	
Additional categories: Phones, multimedia, auctions	
Number of products offered: 800	
Areas of development: Recently launched sites HerHifi.com for women, and CustomHifi.com, a B2B site for the custom-installation market	

electronics, video games, and movies. See side-by-side comparisons of products. The selection includes digital cameras, televisions, and home and car stereos.

etown.com

👍 smooth navigation

👎 shipping costs and return policies can vary among etown.com partners

Consumer electronics is the focus at **etown.com,** a site offering gadgets such as cordless phones and flat-screen televisions. The site also serves up consumer-electronics news, informative features, and a knowledge bank that explains how to buy, use, and troubleshoot equipment.

gadgetuniverse.com

👍 smooth navigation • easy ordering • good return policy

You'll discover gadgets galore at **Gadget Universe**—from useful ones (clocks, stereos, and phones) to fun toy gizmos. The selection includes items for your car, home, and office.

giantsavings.com

👍 smooth navigation

GiantSavings.com offers a wide selection of home electronics, ranging from DVD players to PDAs.

globe-mart.com

👍 smooth navigation • good return policy

Global Mart's electronics area offers audio/video components, flat-panel displays, digital cameras, and multifunction printers. The selection also includes handheld PCs and uninterruptible power supplies.

hifi.com

Best Site winner this month. See p. 197.

igo.com

👍 smooth navigation • easy ordering • good return policy

The **iGo** site sells electronic necessities for folks on the go, including PDAs, cellular phones, and carrying cases. The extensive catalog of add-ons includes antennae, batteries, and other accessories for users of mobile digital devices.

SITE REVIEWS

va.com

👍 smooth navigation • easy ordering

ValueAmerica offers an array of home-entertainment products, including audio and video equipment, cameras, and communications products. Plus, you'll find movies, games, and other media. Extended service plans are available, and online shoppers enjoy free shipping.

theweb-shop.com

👍 easy ordering

Shop **The Web Shop Superstore** for a wide variety of home-electronics offerings, including computers, home-office equipment, cameras, camcorders, and home and car audio.

CAMERAS

abbeycamera.com

👍 links to manufacturer sites • smooth navigation • good return policy

Abbey Camera's catalog of more than 10,000 cameras and accessory items will impress even veteran photographers. The options range from 35mm cameras to medium- and large-format models, darkroom supplies, and professional gear.

keh.com

👍 message board offers technical advice • smooth navigation • good return policy

In business for 20 years, **KEH Camera Brokers** peddles new items as well as good-condition used equipment. The automated buying service gives an immediate quote on what KEH will pay for your used equipment.

www.normancamera.com

👍 good return policy

From point-and-shoot models to high-tech digital cameras, you're likely to find it in **Norman Camera's** catalog. See a large selection of film scanners, video cameras, and accessories.

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photoalley.com

👍 tips and how-to articles • smooth navigation • easy ordering • good return policy

From Agfa to Yashica, if it has a lens, it's at **Photo Alley.** This site features a catalog of more than 11,000 products, ranging from cameras and gadget bags to camcorders and even binoculars.

ritzcamera.com

👍 free shipping on orders of more than $50 • smooth navigation • easy ordering • good return policy

In addition to offering cameras and accessories, **Ritz Camera** also sells photo albums and frames. Shoppers with a retail location nearby can see their photos online in one hour, then order reprints or merchandise with a photo on it.

servicemerchandise.com

👍 smooth navigation • good return policy

👎 many items only available for in-store pickup

In business for nearly 40 years, **Service Merchandise** is a catalog showroom offering jewelry, home accessories, and travel items. The Cameras area of its Web site sells 35mm, digital, and Advanced Photo System (APS) cameras, as well as binoculars and telescopes.

Choosing and Buying a Digital Camera

- You can find a wide variety of digital cameras for every budget and type of user, from $40 toys to $4,000 professional models. Make sure you buy at the right level for your needs. Most consumer-level cameras cost $300 to $700.
- You'll need a camera that can interface with your computer. Some cameras transfer images to your computer over a serial, USB, SCSI, or infrared connection. Other cameras save images on removable media (such as floppy disks, SmartMedia cards, or SuperDisks) that can be read directly on a PC.
- You can find reviews of digital cameras, sample photos, and answers to your questions at PCPhotoReview.com, DigitalCameras.com, the Digital Camera Resource Page (*www.dcresource.com*), and of course, at our own site, computershopper.com. Our parent company ZDNet also has a Digital Camera Supercenter (*http://cgi.zdnet.com/slink?47910*) for finding and buying a camera, and printing photos.
- Once you've made a choice, use price-comparison sites such as DealTime.com or NexTag.com to find the best prices on cameras, media, and accessories. Understand the seller's return policy: Depending on the seller, you may be able to return the camera if you don't like it.
- If you don't need the latest and greatest model, visit online auction sites, where you'll find older models and refurbished units. Try uBid (*www.ubid.com*), eBay (*www.ebay.com*), and ZDNet Auctions (*auctions.zdnet.com*).
- Online photo-finishers Shutterfly.com, Snapfish.com, and Ofoto (*www.ofoto.com*), can make prints from your digital pictures.
- If your pictures will be viewed solely online, a camera with 1-megapixel or lower resolution is fine. If you'll be making prints from your digital pictures, a 2- or 3-megapixel camera will produce higher-quality prints. The chart at *www.digitalcameras.com/printers_resolution.asp* shows the resolution necessary to make prints at 4x6, 8x10, and other common sizes.

Digital Camera Resource Page

BOOKS AND MUSIC

www.alibris.com

👍 Book Hound tool will search for a book for a month and e-mail you • smooth navigation • easy ordering • good return policy

Alibris offers one-stop searching and browsing of hundreds of independent booksellers around the globe. You don't have to be a book collector to appreciate the massive selection in categories from romance to computers.

Alibris

amazon.com

👍 buy and sell rare and unusual items in person-to-person auctions • discussion boards and member Web pages • smooth navigation • easy ordering • good return policy

Amazon.com's catalog of books, CDs, and videos is nothing short of gargantuan. Speedy searches and insightful recommendations make it easy to find what you're looking for, even if you don't know for sure what that is.

audible.com

👍 smooth navigation • easy ordering

Audible delivers the next generation of books on tape. Buy and download audio programs, such as *The Wall Street Journal* or best-selling books. Then listen to the programs on your PC or a portable player.

bn.com

👍 music, DVDs, videos, posters, software, and magazines available • smooth navigation • easy ordering • good return policy

With millions of titles in its catalog, **Barnes & Noble's** site is a book lover's dream. If the book you want is out of print, don't despair: Barnes & Noble has associations with used-book sellers across the country.

bookfinder.com

👍 mailing list for booksellers

BookFinder is a search engine that scans the databases of 15,000 booksellers to find new, used, rare, and out-of-print books. It's a quick way to search many independent bookstores at once for hard-to-find titles.

borders.com

👍 smooth navigation • easy ordering • good return policy • best-sellers and forthcoming books sold for 50 percent off list price

If you've ever gotten lost in one of **Borders'** enormous retail stores, you'll appreciate this vast site. It offers a selection of 10 million books, CDs, and videos. Check out the In the News listings to find today's topical books.

cdnow.com

👍 create custom CDs • site available in seven languages • smooth navigation • easy ordering • good return policy

CDnow is a megasite offering an extensive catalog of titles on vinyl, cassette, and CD. RealAudio sound clips and reviews are available for many of the discs. The Album Advisor learns your musical tastes and suggests other bands you'll enjoy.

cdworld.com

👍 smooth navigation • easy ordering • read reviews of software and books, and write your own

CDworld sells software, video games, movies, and music—more than half a million items in all. You can get movies on videotape, DVD, laserdisc, or movie CD. Video-game choices include Dreamcast, Nintendo, and PlayStation, as well as PC and Mac titles.

checkout.com

👍 smooth navigation • easy ordering • good return policy

The Checkout Entertainment Network offers music, movies, and video games, wrapped up in an entertaining shopping experience. The site serves up featured artists, quizzes, trivia, and lists of top sellers. You'll find plenty of detail about each item, complete with an editor's review, ratings, and technical details.

SITE REVIEWS

codysbooks.com

👍 world's largest selection of Passover books and merchandise • 20 to 30 percent discounts on best-sellers

An independent bookstore based in Berkeley, Calif., **Cody's Books** offers a searchable catalog of its 150,000 in-stock titles. In addition, the store can order any in-print book, plus books published in some other countries. The site offers thoughtful recommendations and reading lists.

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Express.com sells DVD movies, music, video games, and electronics. You'll find plenty of information about each title, and preordering hot releases is a breeze. The Auction area offers collectible goodies from the worlds of television, film, and sports, such as movie props and autographed scripts.

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Business Buyer

LAN FOR RENT

A Look at Top Subscription Computing Services

PLUS

- Site Design Tips From the Pros
- Choose the Right Linux Version
- Get All Your Messages In One In-Box

RENT-A-LAN

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$2789 **E·VALUE CODE** 05876-290927
BUSINESS LEASE: $77/MO., 48 MOS.¹¹
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— *PC Magazine*, July 2000

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VALUE

Dell recommends Windows 2000 Professional for business.

Many Messages, One In-Box

BY LYNN GINSBURG

Unified messaging services let you retrieve e-mail, voice messages, and faxes from a single location.

IT'S GETTING TOUGHER AND TOUGHER TO KEEP UP WITH THE BLIZZARD of e-mail, voice mail, and faxes you receive each day. Take a few days off, and it's nearly impossible. Unified messaging won't lighten the load, but it does simplify things by putting all your messages in one place. These free services integrate your e-mail, voice mail, and faxes into one Web-based in-box. You are assigned a single phone number where all callers leave messages. With some services, the number is local; with others, it's toll-free.

Most of these services offer free basic plans in the hope of upgrading you to fee-based premium services. The two sites we examined, Onebox.com and uReach.com, offer plenty of functionality for free, plus reasonably priced premium services.

ONEBOX.COM

Onebox.com offers a local number with a four-digit extension in 44 area codes in California, Colorado, Florida, Georgia, Illinois, Massachusetts, New Jersey, New York, Ohio, Texas, Virginia, Washington, and Washington, D.C. Onebox, in partnership with ZDNet, *Computer Shopper's* parent company, is expanding to other parts of the United States, as well as internationally.

The Web site's clean interface reveals at a glance the new e-mail, voice mail, and faxes you've received. An icon indicates the message type. Voice messages, which you can listen to using either a QuickTime or WAV player, include a caller's phone number and the date and time they were received. You can view faxes in GIF or TIFF formats, or with a downloadable viewer. You can't send faxes via Onebox, but the company plans to add this capability as a pre-

Onebox uses different colors to differentiate various types of messages; uReach uses different icon styles.

mium service. You can also configure Onebox to retrieve e-mail from your POP accounts.

If you can't get to a computer, you can retrieve voice and e-mail messages by phone. The service recites e-mail messages using text-to-speech technology. It sounds strange and mechanical, but it works. You can even access messages using a wireless phone.

A basic calendar and address book is accessible both from the Web site and by phone, so you can maintain appointments and phone lists from the road.

Onebox places no limit on the number of messages you can receive, and the 3MB storage limit (about 50 minutes of voice-mail messages) shouldn't pose a problem as long as you keep deleting older messages. The $4.95-per-month premium service provides a seven-digit number with no extension, 25MB of storage (about 400 minutes of voice-mail messages), and your own customized greeting in place of the standard Onebox greeting.

UREACH.COM

The services uReach.com offers are comparable to those of Onebox. You get an integrated in-box from which to access voice mail, e-mail, and faxes; the ability to listen to voice mail and e-mail by phone; and a calendar and address book accessible via the Web or phone. Wireless access is free for now, but the company warns that could change.

Unlike Onebox, uReach offers callers a toll-free number plus extension. After 30 minutes per month, though, the company charges up to 10 cents per minute. (The actual per-minute charge is based on the amount of additional time you use.)

The premium service won't cost you anything; you're charged only for the time in excess of 30 minutes per month. You'll have to provide a credit-card number to receive the premium service, however. The company says this is for identification purposes and to deter users from signing up for multiple numbers. The premium service gives you a toll-free number with no extension and the ability to forward your uReach calls to another phone. This means callers can reach you at your home or office using your toll-free uReach number.

UReach lets you send faxes (unlike Onebox), though the procedure is rather roundabout. You must send the fax by e-mail to the uReach fax server, which then sends the fax on to its destination anywhere in the United States.

It's your call whether you use these services to unify your messages or just create new receiving outlets. But even with their limitations, these no-cost services are among the best freebies the Web has to offer. ▼

BUILDING YOUR BUSINESS

Great Site Designs Spur Sales

BY DONNA TAPELLINI

Is your Web site driving customers away? Do they have to scroll through page after page before they can make a purchase, cool their heels while large image files load, or answer too many questions at checkout? If the answer is yes, your problem is bad design. Many e-commerce sites rush to open their cyberdoors without giving a thought to the shopping experience. The result could send surfers to your competition, never to return.

To help you fix design flaws that detract from the buying experience, we queried designers at top site-building shops. Here are eight of their most valuable tips.

① USE TRICKLE-DOWN NAVIGATION.
Give visitors an overview of what you're selling, then let them progressively click down to the details of a product. Keep as much information visible as possible without cluttering the screen.

"We try to create understandable, digestible, global navigation structures that trickle down to the local level," says Spencer Spinnell, executive vice president and creative director for Koko Interactive (*www.kokonet.*

These ⑧ tips from design pros help you build a site that fosters buying.

com) in New York. At 2glow.com, a site Koko Interactive designed, visitors can view top-10 lists of beauty and personal-care products. From the first page, they can choose among four product categories: Body, Face, Hair, or Room. A drop-down menu under Body, for instance, lists items such as soaps and lotions. Choose soaps, and 10 grayed-out photos pop up. As you pass your mouse over each it lights up, and you can see a description of the soap, along with star ratings. At this point, you can click to learn about ingredients or make a purchase.

② SWEEP NAVIGATION UNDER THE CARPET.
Often, navigation is too conspicuous on a Web site. "You want to see the prod-

ucts, not the navigation," says Michael Felber of New York-based Oven Digital (*www.ovendigital.com*), designer of the e-commerce site for upscale jeweler Tiffany & Co. "It shouldn't take up half the screen." In fact, Felber says, navigational elements should be hidden from the user's view.

③ MAKE YOUR PRODUCTS LOOK GOOD, BUT DO IT QUICKLY.
This is one of the most challenging conundrums for the e-commerce designer. Web surfers are an antsy bunch, so your site needs to appeal to those with short attention spans. Web surfers are looking for satisfaction very quickly. Unless membership is required for shopping, it should not take more than four to six clicks (not counting drilling down for details) from the front page to checkout.

At the same time, you need to give shoppers a good look at your product. Shopping your site shouldn't feel like flipping through an Excel spreadsheet, says Spinnell. To make 2glow.com look and feel as much like a brick-and-mortar store as possible, Koko Interactive's designers opted

for Macromedia Flash and Generator over HTML to produce robust product shots that load quickly.

If you're exhibiting a lot of high-quality product photos, keep other graphics on the light side. "Use tables, HTML graphs, and color," Spinnell advises.

4 KEEP IT SIMPLE.

Like a good print design, a Web site needs white space. Spinnell advises against adding too much saturated color to a page.

To keep your site straightforward, effective naming and structure are also essential. According to Oven Digital's Felber, "The hierarchical tree must be structured in an intuitive way." Whenever your surfers click on a link, they should get what they're expecting. Don't get

Quick and easy drill-downs at Tiffany & Co.'s site get shoppers from product details to the purchase page in just a few clicks.

Effective use of white space at OvenDigital-designed MoMA gives the museum's online store a clean, uncluttered look.

too creative when naming a link or a page. On Tiffany's site, for instance, the jewelry may be elegant, but the language is plain. Click on Shop, then Rings, and that's exactly what you'll get.

Although the Web offers a multitude of options for interactivity, don't overdo it. "You can do so many things on the Web

Mouse-overs at 2glow's site give users easy access to details and ratings for products that interest them.

that e-commerce sites fall into the trap of offering too many options," Felber says. "Like a Swiss Army knife, everything is there. The problem is, none of it works. You've got to balance the number of options with ease of use."

5 DON'T SKIMP ON THE INFORMATION.

Though it's important to keep things simple, you don't want to turn surfers away because they couldn't find the answers to their questions. Anticipate their every question to make sure you answer them clearly and specifically. Before you even start to think about the look and feel of a site, gather every piece of information about the company that could be important to shoppers.

Fort Point Partners *(www.ftpoint. com)* in San Francisco, designers of Kmart's BlueLight.com, advocates a similar strategy. "Spend the major financial resources to make sure your site rocks right away, rather than conducting countless relaunches that waste time and money and turn off customers," advises Kevin Smith, vice president of business development. Then spend smaller sums on taking risks to attract buyers.

6 FOR BEST COLOR ACCURACY, TEST AND TEST AGAIN.

If you're selling a product where color matters, such as apparel, color fidelity is a crucial to minimizing product returns. However, color-accuracy tools are marginal at best, Spinnell and Felber concur. "You'll need to do lots of cross-browser and cross-system testing," says Spinnell. For example, there's a tremendous

color shift from the Mac to the PC. To be safe, he advises sticking with the 256-color palette and viewing your site on a variety of browsers and computers.

7 PROTECT YOUR BRAND IDENTITY.

On the Web, your company's brand is more than just logo and color; your Web site is your brand identity. The page layout, HTML links, amount of text on the screen, and number of steps in the checkout process all contribute to your identity. Plan carefully to ensure you communicate your core values to the customer.

8 STICK TO THE LOWEST COMMON DENOMINATOR.

This may sound like a negative, but it's what makes a Web site work for the largest possible number of users—and if you're trying to make a sale, that should be your goal. Assume most people are connecting at 28.8Kbps, with 800x600 resolution. That way, you're better able to craft imagery and decide how much is HTML (text, color, and tables) and how much is image-driven.

Try to build sites that work regardless of the user's configuration. Writing percentage-based tables in HTML, for instance, allows
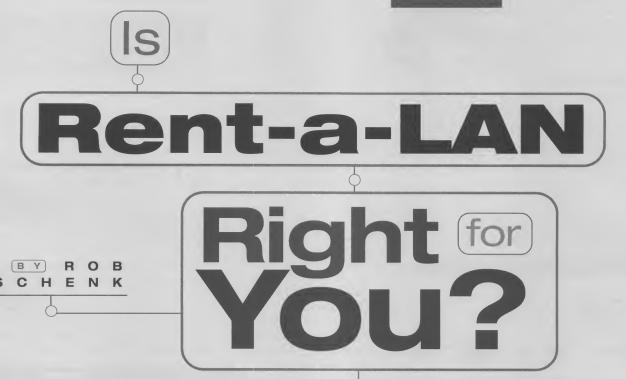
FortPoint-designed HearMusic gives shoppers a good look at—and a good listen to—the CDs it sells.

the browser frame to scale up, so the tables look good at any resolution.

Creating a site that's attractive and easy to navigate requires compromise. You must find a way to leave in what's essential and throw out the rest. "You try to build a site as small as possible," Felber says, "but sometimes even that is too big." Once you're ready to put up your site, edit it down by 75 percent, advises Fort Point Partners' Smith. Remember, this is not a catalog or the Yellow Pages; it's e-selling.

Often, the best way to evaluate your site is to be a shopper. Pretend you're a customer and try to buy something at your own site. If you leave in frustration, these tips should help you fix the problem. ▼

NETWORKABLE

Is Rent-a-LAN Right for You?

BY ROB SCHENK

Subscription-based computing services let you outsource acquisition, maintenance, and support.

I N a perfect world, computers would never crash, hardware and software would be maintenance-free, and users would never complain. In the real world, they do, they aren't, and they will.

Computer maintenance is a costly affair, with the average business spending between $4,500 and $7,500 per year per PC, according to the Gartner Group. And if your business matches the profile of the average Gartner Group respondent (fewer than 46 employees), you don't even have a full-time IT staffer. Instead, you use either a resident guru who dons an IT cap when necessary, or an outside consultant on an as-needed basis. Either approach has flaws. In the first scenario, mounting computer problems can keep your resident guru from accomplishing regular work. In the second, affected employees may twiddle their thumbs while waiting for the consultant.

Borrowing from approaches used at large enterprises, several companies have begun offering subscription-based computing services to small businesses. For a monthly fee,

these companies offer a vast array of services, including network installation, maintenance, monitoring, Web-based e-mail, vertical applications, Web-site hosting, nightly backups, automatic software updates, secure remote access, firewall and antivirus protection, high-speed Internet and intranet connectivity, remote-control PC troubleshooting, and phone support. They even offer replacement PCs configured with your specific settings in the event of a hardware problem.

The subscription model offers advantages over traditional methods of acquisition, maintenance, and support. Because there's no large capital investment, you can afford services otherwise out of reach. The predictable monthly fee per PC helps you project costs. And without the headaches and costs associated with network maintenance, you can devote your attention to your company's primary mission.

MANAGING THE RISKS

The subscription model is compelling, but it's not for everyone. For starters, your

data resides on someone else's server. Although the chances are remote, your mission-critical data could be compromised. To prevent such occurrences, outsourcers employ powerful data encryption and allow access only to a few high-level staff members. But if your data is highly sensitive, this small risk may still be too high. You must also feel comfortable signing a long-term contract, often for as long as three years.

If your business relies on homegrown applications or maintains a cross-platform network (combining Windows, Macs, Novell, or Linux), you may find the subscription model lacks the flexibility to accommodate your particular needs. Some specialized applications may not work well under Windows 2000, for instance, so you may have to update custom software to enable the outsourcer to support the application reliably. Likewise, vendors generally provide only basic network-connectivity support for the Macintosh platform, and Linux generally isn't supported at all.

Outsourcers have created complex network infrastructures capable of managing large numbers of networks—but this does not always translate into adequate maintenance and support at your site. Outsourcers face the challenge of proving to clients that they can accurately and promptly diagnose problems, scale to demand, and optimize network performance. Be sure to hold them accountable for agreed-upon service levels, and insist on clear and useful reports on a regular basis.

BEFORE YOU SIGN

Before you even make any calls, do some preparatory work. First, take a complete inventory of your servers, desktops, network infrastructure, and applications. Then compile a list of services you require, such as secure remote access, firewall protection, and printing.

Next, think about your company's growth over the next six months to two years, so you can choose the right degree of scalability. Also, determine the level of support you need. Do you need 24-hour-daily support, or is 12 hours per day sufficient? Make sure your service-level agreement (SLA) has a clause stipulating that if performance dips below a certain level, you'll be credited on the next bill.

Consider the security implications of outsourcing your IT structure. Make sure you're comfortable with the outsourcer's security policy. Finally, verify the provider's credentials by checking references. Have your list of questions ready.

When you've narrowed down your choices, prepare a request for quote (RFQ). That's what we did to assess the offerings of three leading subscription-based computing

companies—CenterBeam, Everdream Corp., and micronpc.com.

CENTERBEAM

Santa Clara, Calif.-based CenterBeam gears its service to small businesses in the 10- to 500-seat range. At press time, service was available in 10 cities nationwide and should be available in another 10 by the time you read this. CenterBeam targets companies in metropolitan centers with

DSL connectivity.

The service consists of two parts: office infrastructure (LAN, printers, and desktops) and a centralized data center (e-mail, antivirus, and security protection). CenterBeam supplies Dell Computer Corp. PCs as part of the service. Clients communicate with the data center over a secure, high-speed Covad DSL connection. Through this secure link, clients can safely access the Internet and have their data backed up daily.

CenterBeam's Windows 2000-based enterprise backbone offers a high degree of remote manageability and system stability. It's the only vendor to have standardized on wireless LAN technology

(Lucent Orinoco, at 11Mbps), eliminating the significant expense of cabling installation. And without the cable tethers, employees can more easily move their PCs and laptops around the office. (They can also move around the country, while retaining access to the corporate LAN.) But wireless technology does pose security risks. To address these, the company enables encryption by default. The trade-off is lower overall network speed.

CenterBeam's 24-hour-daily phone support can also be reached with a click-to-talk button on every desktop. Technicians can address problems by taking remote control of a user's PC (with permission). If necessary, CenterBeam can deploy a "hot spare," complete with user data, within an hour.

Dell and Microsoft Corp. are significant investors in CenterBeam, and these companies aid with support and manageability. Desktops come with Windows 2000 preinstalled. Those who want to retain some desktops that aren't running Windows 2000 can run their network in mixed mode. CenterBeam offers a range of Microsoft applications, including the full Microsoft Office suite and Exchange e-mail.

Customers can also access application service providers (ASPs) for an additional monthly fee through CenterBeam. The vertical-market ASPs cover areas such as customer-relationship management, human resources, and sales-force automation. CenterBeam has much stronger ASP options than the other two companies we look at here.

Signing on with CenterBeam is a 36-month commitment. With an initial installation and data-migration fee of $1,500 and an average monthly cost of $200 per desktop and $275 per laptop, it's the priciest of the three services. But the monthly fee includes the DSL line and all support services. And

unlike Everdream and micronpc.com, which provide only basic connectivity for Macintoshes, CenterBeam provides both network connections and support.

Despite its higher price, CenterBeam's solution is well-crafted, robust, and stable, offering a high level of integration and standardization, plus an impressive range of ASP partnerships.

EVERDREAM CORP.

Everdream currently targets businesses with two to 20 seats—those that normally purchase equipment through local resellers. But the company is in the process of building networking solutions capable of supporting up to 100 seats. Its market currently centers around the Bay area, but it's expanding nationwide. PCs are Everdream-branded Pentium IIIs with 17-inch monitors; laptops are also available.

The company provides all the necessary switches and routers to connect to both the Internet and its data center. Everdream is evaluating wireless solutions, but for now installation costs will include Category 5 network cabling. Because of its switched architecture, Everdream's network performance is higher than CenterBeam's, and you can choose between Windows 98 and 2000.

WHERE TO RENT A LAN

COMPANY	CenterBeam Santa Clara, CA 408-844-0900 **www.centerbeam.com**	Everdream Corp. Fremont, CA 877-437-3264 **www.everdream.com**	micronpc.com Meridian, ID 800-438-3343 *micronpc.com*
NUMBER OF SEATS SUPPORTED	10 to 500	two to 20	Up to 2,500
STRENGTHS	ASP options	Service and support	Web-hosting services

Like CenterBeam and micronpc.com, Everdream offers e-mail, Microsoft Office applications, secure remote access, Web hosting, firewalls, and antivirus protection. You can also rent a range of third-party software for a monthly fee. A single Intuit QuickBooks license, for instance, costs $17 per month. Upcoming ASP partnerships will provide access to Web-based vertical applications, though not as many as CenterBeam already offers.

Support is Everdream's strong suit. Phone and e-mail support is available 24 hours daily, and technicians can access users' systems remotely. After clicking an icon on the desktop, users will receive a callback within 90 seconds. All systems include application tutorials and help files.

Everdream's proprietary "self-healing" technology helps keep PCs up and running. If you accidentally delete a system file, for instance, technicians can run a script that automatically reinstalls the file. The PCs' 20GB hard drives contain clean system images on a hidden partition, so if you mess up your PC, a technician can recreate it from the hidden images. Everdream performs daily backups to its secure data center, and administrators use homegrown applications and scripting to keep PCs running at full capacity.

The service costs $99 per month per managed PC and $229 per month for a Toshiba laptop. You'll pay extra for a local server, and data migration will run you $250 per PC and $1,050 per server. Your commitment to Everdream is the shortest of the group, however, at 30 months.

Standard service is dial-up. For DSL, you'll pay an extra monthly fee, unless you sign up more than 10 PCs. Everdream can also bond several phone lines together to increase Internet bandwidth. If you need that much bandwidth, however, we suggest you select DSL or cable instead.

Everdream is a good choice for small businesses requiring high levels of support and reliability.

MICRONPC.COM

The first major PC maker to enter the subscription-service arena, micronpc.com offers services to businesses with up to 2,500 seats. A single monthly fee includes PCs, laptops, servers, network-infrastructure equipment, and LAN-integration work.

On the support side, the service is less comprehensive than the other offerings. The company doesn't currently offer remote-management capabilities, though it may in the future. Users must rely on phone support or pay-per-visit troubleshooting sessions. Micronpc.com will install and configure backup solutions, but you'll need to switch backup tapes yourself. In contrast, CenterBeam and Everdream perform the backup and restore procedures for you. Though micronpc.com will connect Macs to your network, you're on your own for ongoing support.

The service assists with data migration, LAN-integration work, and server setup and installation. Phone support for desktops and laptops is available 24 hours a day, but if the problem lies with your server, you're limited to three free resolutions per year.

NETWORKABLE

Micronpc.com's subscription computing service gives you easy access to its HostPro Web hosting services. For an additional $50 per month, HostPro's Netpro package includes 200MB of hard drive space, 20 e-mail accounts, 10 RealAudio/RealVideo streams, and 20,000MB of traffic per month. E-commerce features include a shopping cart with SSL, and support for Authorize.Net and CyberCash. The service supports Access, FoxPro, and Cold Fusion databases.

Another micronpc.com service, Mservices, includes onsite server support, system upgrades, peripheral installation, and network operating-system resolutions. You can pay per incident or purchase a package. Alternatively, for Web-based hardware diagnostics, software updates, and self-healing technologies, go to *connectedsupport.com*.

Micronpc.com's IT package requires a 36-month commitment and costs about $90 per month per PC for all network infrastructure equipment, a local server, e-mail, Internet connectivity, and remote-access capabilities. HostPro's Netpro service costs an additional $50 per month, but you have the convenience of having both services on one bill. Data migration costs $79 per desktop, while server migrations are custom-quoted. DSL also carries an additional monthly fee, depending on the speed you select.

Although micronpc.com is cheaper than the other services, its lack of remote-manageability options is a drawback; manageability can significantly improve a small business's efficiency. The Web-hosting addition offers significant value, though its LAN-manageability services are a step behind those of CenterBeam and Everdream.

IS IT FOR YOU?

The subscription-service model makes good sense if you decide a monthly fee is appropriate for the complexity of your network. However, many small businesses haven't itemized the true costs associated with maintaining a network and are unable to cost-justify a subscription-based service. In most cases, such maintenance costs are higher than you imagine.

We believe the subscription-service model is a good fit for homogeneous PC networks running common office-productivity applications. Companies with more complex needs, such as mixed networks, may prefer to wait until subscription services have more fully integrated additional hardware and software platforms. ▼

Best Linux For Business

BY LOU GRINZO

Picking the right version just takes planning.

FOR COMPANIES WITH ACCESS TO STRONG PROGRAMMING RESOURCES, adding the Linux OS as a complement to (not a replacement for) Windows can provide access to specialized applications. Linux is especially popular among those who maintain Web servers, but which Linux version is the best for your situation?

For those taking a closer look at Linux, an essential first decision is picking the "distribution." Unlike Windows, which has only a few versions in production, all from the same vendor, Linux offers many different ones, called distributions (or "distros," in Linux-speak). These are available from a long list of companies and individuals, priced from nothing to hundreds of dollars. Even restricting yourself to those that run on Intel x86 hardware leaves literally dozens of options.

AND THEN THERE WERE THREE

It's useful to group the distros into three categories: commercial, noncommercial, and "loopback." The commercial products install either in place of or alongside the operating system currently on your system, and include some very complete packages, particularly the "big five": Caldera OpenLinux, Corel Linux, Red Hat Linux, SuSE Linux, and TurboLinux. The commercial distros can be overwhelming because of the many applications and utilities they include; SuSE 6.4, for example, is on six CDs.

The noncommercial distros, such as Slackware and Debian, tend to be more popular with longtime Linux users, because they make it easiest for knowledgeable users to retain complete control over the entire system. But these packages provide the least in terms of handholding during installation and administration, so there's a clear trade-off. Note that most distros require either their own hard drive, or the repartitioning of your drive to make room for Linux alongside the current operating system.

The loopback distros are an exception, since they don't require hard drive partition-

ILLUSTRATION BY TIM COOK

ing. Instead, the entire distribution, including applications, utilities, and graphical interface, is stored in about a dozen files and is simply copied to a directory onto the hard drive containing your Windows system. One of those files is several hundred megabytes and contains the entire file system for Linux. When you want to switch from Windows to Linux, you shut down to DOS mode, switch to the Linux directory, and then run a DOS BAT file. Once inside Linux, you can use what's encapsulated in that huge file, as well as all the files on your Windows configuration. Loopback distros,

such as Phat Linux *(www.phatlinux.com)*, are a terrific way to test-drive Linux without disturbing your Windows configuration.

YOUR SKILLS, THEIR POPULARITY

A critical factor in choosing a Linux distro is your company's level of in-house expertise—with computers in general and with Unix-like operating systems in particular. If you have resident Linux or Unix gurus, you have many more options.

Because no user lives by an OS alone, you must consider applications and support. Not surprisingly, this is where the bigger-name, commercial packages are strongest. In fact, if you read through the listings of downloadable software on sites such as freshmeat.net and SourceForge *(www.sourceforge.net)*, you'll see that many programs are provided as source code (which you must compile into a running program) as well as binary packages prebuilt for Red Hat. These binaries will often run on various distributions, but sticking with the most popular distro is still a wise idea when you're just starting out.

If you're eager to get some hands-on experience with Linux in your business environment but want to stay as isolated as possible from disk partitioning and other technical details, try one of the freely downloadable loopback distros.

On the other hand, if you want the easiest installation available in a non-loopback distro, give either Caldera Open Linux or Corel Linux a try. Both offer completely automated options for repartitioning your disk and installing Linux alongside Windows, or for letting Linux take over the entire disk.

If you can handle a normal distribution process and want to use the widest possible selection of commercial and free software, Red Hat is your best option.

For more information on the distributions, as well as download sites, see Linuxberg *(downcity.linuxberg.com/distribution.html)* or Linuxiso.org. It's also a good idea to peruse the entire set of Linux how-tos *(www.linuxdoc.org/docs.html#howto)*, particularly those related to hardware compatibility and configuration issues.

As Linux continues to grow in popularity, more and more companies will face the challenge of taking advantage of what it offers. But be sure to select the Linux distro that really matches the needs and resources of your business. ▼

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18.4GB	2MB	7200	ST318436LW	$299	$429
18.4GB	4MB	7200	ST318436LWV	$319	$449
18.4GB	4MB	15,000	ST318451LW	$565	$695
36.7GB	4MB	10,000	ST336704LW	$619	$749
36.7GB	16MB	10,000	ST336704LWV	$669	$799
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73.4GB	10,000rpm	4MB	ST173404FC	$1129

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WD75AA*	.7500	.9.5MS/5400	.2048K	.3.5"/1"H	.$74
WD102AA*	.10200	.9.5MS/5400	.2048K	.3.5"/1"H	.$75
WD136AA*	.13600	.9.5MS/5400	.2048K	.3.5"/1"H	.$82
WD153AA*	.15300	.9.5MS/5400	.2048K	.3.5"/1"H	.$83
WD102BA*	.10200	.9 MS/7200	.2048K	.3.5"/1"H	.$94
WD153BA*	.15300	.9 MS/7200	.2048K	.3.5"/1"H	.$106
WD205AA*	.20500	.9.5MS/5400	.2048K	.3.5"/1"H	.$95
WD205BA*	.20500	.9 MS/7200	.2048K	.3.5"/1"H	.$122
WD307AA*	.30700	.9.5MS/5400	.2048K	.3.5"/1"H	.$122
WD450AA*	.45000	.9.5MS/5400	.2048K	.3.5"/1"H	.$172

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FUJ3012AT	.10200	.10MS/5400	.512K	.3.5"/1"H	.$75
FUJ3130AT*	.13000	.10MS/5400	.512K	.3.5"/1"H	.$79
FUJ3017AT*	.17000	.10MS/5400	.512K	.3.5"/1"H	.$84
FUJ3024AT*	.20400	.10MS/5400	.512K	.3.5"/1"H	.$93
FUJ3136AH*	.13600	.9.5MS/7200	.2048K	.3.5"/1"H	.$97

Maxtor www.maxtor.com
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MAX1025400*	.10200	.9 MS/5400	.2048K	.3.5"/1"H	.$75
MAX1027200*	.10200	.9.5 MS/7200	.2048K	.3.5"/1"H	.$91
MAX1535400*	.15300	.9.5 MS/5400	.2048K	.3.5"/1"H	.$79
MAX1537200*	.15300	.9.5 MS/7200	.2048K	.3.5"/1"H	.$99
MAX2045400*	.20400	.9.5 MS/5400	.2048K	.3.5"/1"H	.$91
MAX2047200*	.20400	.9.5 MS/7200	.2048K	.3.5"/1"H	.$124
MAX3075400*	.30700	.9.5 MS/5400	.2048K	.3.5"/1"H	.$123
MAX3077200*	.30700	.9.5 MS/7200	.2048K	.3.5"/1"H	.$162
MAX4095400*	.40900	.9 MS/5400	.2048K	.3.5"/1"H	.$159
MAX4097200*	.40900	.9.5 MS/7200	.2048K	.3.5"/1"H	.$217
MAX4615400*	.46100	.9 MS/5400	.2048K	.3.5"/1"H	.$202
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QU315000LB*	.15000	.8.9MS/5400	.512K	.3.5"/1"H	.$89
QU315000LM*	.15000	.8.9MS/7200	.2048K	.3.5"/1"H	.$102
QU320400LB*	.20400	.8.9MS/5400	.512K	.3.5"/1"H	.$102
QU320500LM*	.20500	.8.9MS/7200	.2048K	.3.5"/1"H	.$139
QU326000LA*	.26000	.8.9MS/5400	.512K	.3.5"/1"H	.$127
QU330000LB*	.30000	.8.9MS/5400	.512K	.3.5"/1"H	.$129
QU330000LM*	.30000	.8.9MS/7200	.2048K	.3.5"/1"H	.$169

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TO6015MAP	.6000	.13MS/4200	.1024K	.2.5"/9.5MM	.$122
TO1214GAP	.12000	.13MS/4200	.1024K	.2.5"/9.5MM	.$167
TO1814GAV	.18100	.13MS/4200	.1048K	.2.5"/12MM	.$239
TO2016GAP	.20000	.13MS/4200	.1024K	.2.5"/9.5MM	.$241

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MODEL#	CAP.(MB)	ACCESS/RPM	CACHE	FORM/HT	PRICE
IBM206000	.6000	.12MS/4200	.512K	.2.5"/12.5MM	.$129
IBM208100	.81000	.12MS/4200	.512K	.2.5"/12.5MM	.$157
IBM212000	.12000	.12MS/4200	.512K	.2.5"/9.5MM	.$165
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WD18310LW	.18300	.5.2MS/10000	.2048K	.3.5"/1"H	.$241
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ST39216W	.9200	.5.8MS/7200	.2048K	.3.5"/1"H	.$212
ST39216N	.9200	.5.8MS/7200	.2048K	.3.5"/1"H	.$212
ST318416N	.18400	.5.8MS/7200	.2048K	.3.5"/1"H	.$319
ST318416W	.18400	.5.8MS/7200	.2048K	.3.5"/1"H	.$319
ST318436LW	.18400	.5.8MS/7200	.2048K	.3.5"/1"H	.$319
ST318404LW	.18400	.5.2MS/10,000	.4096K	.3.5"/FH	.$379
ST136475LW	.36400	.7.6MS/7200	.1024K	.3.5"/FH	.$774
ST336704LW	.36700	.5.2MS/10,000	.4096K	.3.5"/FH	.$629
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TODM1402BARE	12X-40X DVD	ATAPI	135/90MS	256K	$109

MITSUMI www.mitsumi.com

MODEL#	SPEED/TRANS	INTERFACE	ACCESS	CACHE	PRICE
MITFX4820	48X/7200KB	ATAPI	85MS	128K	$41
MITCDRW4804TE	4X/4X/24X	ATAPI OEM	135MS	2048K	$129
MITCDRW4804TER	4X/4X/24X	ATAPI RETAIL	135MS	2048K	$149

YAMAHA www.yamaha.com

MODEL#	W/RW/READ	INTERFACE	ACCESS	CACHE	PRICE
YACRW8424SOEM	8X/4X/24X	SCSI	140MS	4096K	$187
YACRW8424EOEM	8X/4X/24X	ATAPI	140MS	4096K	$167
YACRW8424E	8X/4X/24X	ATAPI	140MS	4096K	$174
YACRW8824SOEM	8X/8X/24X	SCSI	140MS	4096K	$212
YACRW8824EOEM	8X/8X/24X	ATAPI	140MS	4096K	$159
YACRW8824S	8X/8X/24X	SCSI	140MS	4096K	$222
YACRW8824E	8X/8X/24X	ATAPI	140MS	4096K	$169

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SYCRX140S/CH	8X/4X/32X	SCSI	150MS	4096K	$222
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The Hard Edge

BY ALICE HILL
AND BILL O'BRIEN

*Bill goes ASCII; the mile-high calling club;
and inside some new CPUs*

"**A**LICE, I'M LOSING MY IDENTITY." THAT ONE CAUGHT HER BY surprise. Alice had brought the IAS shocks and Hotchkiss springs and bars as suitable gifts for this year's celebration of Bill's birth. It should have been a calm and quiet day. (Well, except for the clank of parts and rivulet of swear words flowing out from under Bill's S-10 pickup.)

She slapped the button that linked the video intercom system between the *guyrage* Bill had built above the Basement of Doom and Pepsi-Cola and the BofD&P itself. "How about some gingko biloba?" She'd seen that on some billboard while tooling the byways of her beloved California.

"Nah, it's not that. My mind's still as sharp as, er, um, uh, well, that's not it. It's my name. You wouldn't understand because you have an ASCII-friendly name. Did you know nearly half the Web sites that want me to log in can't handle the apostrophe in my name? To almost 50 percent of the Internet I've become 'Bill OBrien' or, worse still, 'Bill Obrien.' That apostrophe in 'O'Brien,' and those two capital letters, are part of a rich Irish tradition."

"They won't accept the apostrophe or the double caps?" Sometimes it is best to let Bill run to conclusion.

"I don't want to be a preprocessed vanilla citizen of Netania, y'know? The stupid part of it all is that it's maybe three lines more of code to be able to accept the most common name variants that include symbols or multiple capital letters. People were dealing with the problem back in the days of Fortran and Cobol. Even *I* could code around it. You have to wonder just what low level of expertise these modern-day Net programmers pretend to have to get away with that."

"So what are you going to do?" The end was near. She could sense it.

"I think I'll give it a brief mention in the column. Maybe I can rabble-rouse some of the multitudes out of their apathy long enough to fire off an e-mail to

Web sites that deny their identity."

"Then again, Bill, anonymity is a functional cornerstone of the Internet."

"Yeah, there's that."

CALL THE FRIENDLY SKIES

When Virgin Atlantic Airways announced it would offer the big daddy of all call forwarding—from the ground to your cell phone miles above the earth—the world was instantly divided in two. The heavy cellphone users clapped and sang like small children, while the anti-cell-phone crowd imagined nightmarish scenarios of being trapped in coach beside a pea-brained meandering chatterer. Our stand on the issue aside, let's take a "Hard Edge" moment and check out the spectacular technology involved.

According to Virgin Atlantic, the Earth Calling program is easy to use. You get a special card from your cell-phone provider and carry it in your wallet. On an Earth Calling flight, you swipe the card through a reader in your seat's armrest and dial a registration number on your cell phone. Once you've been validated, your cell phone's call is redirected to your seat's headset. If you're not wearing the headset, the LCD monitor in front of you will alert you to the incoming call.

To deactivate the call forwarding, simply swipe the card through the armrest again. People calling from land are charged for the normal land part of the call, and the passenger is charged for the service.

What fascinated Alice was not the joy of overhearing a thousand inane conversations as she sits trapped in coach (Bill is wise enough to never, ever set foot on an airplane), but the thought that this may be the first time the phone number is separated from the phone. Yes, call forwarding existed on regular, old-fashioned telephones, but this concept of having a number and turning on and off the device of your choosing is really only beginning. Taking her patented "Hard Edge"-to-the-farthest-point view, Alice can see a day when you may choose to receive calls on your friend's television or your Palm V.

It's funny in an ironic way, that the more wireless technology evolves, the more connected it makes other things. You and a number suddenly join in a far more meaningful way than the lifetime of phone numbers you've gone through up till now. The same is true of the connection possibilities. True, cell-phone calling can be annoying, but why not be able to place a call from your laptop on the beach or use your watch as the true "Dick Tracy" device? As the old AT&T commercial promised so many years ago: "You will." *("Six, two, and even—over and out." —Comic Bill.)*

The big drawback, in Alice's mind, is the shouting. Americans in particular have come under fire (as usual) for having overly loud speaking voices when using their cell phones. Sociologists claim Americans aren't used to filtering out loud background noises the way Europeans are, so they overcompensate by shouting. Alice recalls loud American tourists all over the globe happily shouting without cell phones, but it's an irony that has come home to roost. Until Americans can truly tone it down and stop using their cell phones as megaphones, these important

advances will get only negative press instead of the fine applause they deserve.

Alice and Bill hereby suggest a logical technical pairing. Let the folks at Miracle-Ear create a boosted-volume earpiece that lets you hear the other caller clearly without straining. Talk about taking technology out of a niche and blasting it into the mainstream. (Hello, Miracle-Ear!) Once we've cleared that hurdle, Alice swears cell-phone hatred will die down. Meanwhile, if someone can figure out what to do about the loud tourists, Alice and Bill are all ears.

E-MAULED

Word has it CDNow isn't doing too well. (Note: CDNow was purchased by Bertelsmann at press time.) And lately (in "Hard Edge" time) even Amazon.com is suffering a downturn in its fortunes. As the official chroniclers of All Things Computer, Great and Small, we'd like to offer some suggestions to these two noble pioneers of the e-mall: "Knock it off!"

Without fail, CDNow sends Bill periodic reminders of its existence replete with suggestions that it knows exactly what songs he wants to buy. First and foremost, stop with the reminders. They're annoying. Bill has gone out of his way (to his neighborhood Sam Goody's) to buy tunes locally rather than go to the CDNow site just because of those reminders. And because Bill hasn't liked much music of the past 10 years (except whatever older groups have released), it's the height of CDNow arrogance to think it would know what Bill's eclectic selection of music might be on any given day. (Some days he listens to Dr. Laura just for the transition music between segments.)

So perhaps if CDNow would stop aggravating people (and as special as Bill may be, it's impossible that he's the only one who feels this way), maybe things would get better.

Don't worry, we haven't forgotten about Amazon.com. Here's a little tidbit from an order Bill recently placed and then canceled because of unavailability:

1 of: Red Devil Inc. 4251 5-In-1 Painters Tool [Tools & Hardware]
By: Red Devil Inc. Ordered from publisher (This item has 4-6 week availability.)
Cancel 1 copy

What's the deal here? Someone publishes a 5-in-1 painter's tool? Would that be in hardcover or paperback? (Perhaps one of the new Tools on Tape editions?)

And Bill canceled a "copy"?

We all know Amazon started as a bookseller. Cool beans. But it's branched out into other things (now tools, apparently). So why hasn't anyone at Amazon (Jeff, are you listening?) spent some quality time revising the template it's using for sales?

Sure, a book and a hacksaw are both commodities. And they're sold in roughly the same way. But nobody publishes a hacksaw. It's a manufactured "item," not a "copy." We're not asking Amazon to come up with smooth pickup lines that no inflatable woman could resist. It's just a matter of changing the two literals in the reporting script to variables that are keyed to the section you're shopping in.

Amazon, you can't keep applying the same template to every new category of product you start to sell. Ask Apple. Doing that almost killed the company. We're not doofuses on this side of the modem anymore. You have to make it at least look like you know what you're carrying.

SHORT TAKES

■ This year's PC Expo was hardly about PCs. It was about gadgets—especially wireless gadgets that get you online in some way. It was actually a return to the roots of

Microsoft argued IE should be free because everyone was on the Web. Everyone is also doing word processing and spreadsheets, so Microsoft Office should also be free.

PC Expo, which didn't start as a personal-computer exposition. More important, is it a hint that PCs are starting to get boring?
■ Thunderbird and Duron. No, they're not a futuristic sci-fi marionette show and an oil additive. They're AMD's newest CPUs. It took AMD more than a year to integrate its L2 cache on-die, and one of the first results is the Thunderbird. Now maybe the Athlons and the Pentium IIIs will show equivalent performance. Then there's the Duron, which some claim is AMD's Celeron killer. Yawn. Don't be surprised if Intel again one-ups AMD (if it hasn't already). We told you years ago AMD's number-one job was to play catch-up with Intel. So now AMD's invented the Coppermine Pentium III and the Celeron.

How about some innovation for a change?
■ Intel. Well, until Intel is ready to admit it made a huge mistake with RDRAM for the personal-computer marketplace, we have a problem believing any of Intel's intel. In the words of Bill's one-time associate, Sal Hepatica, "Fuhgeddabowdit."
■ Despite incorporating 3,500 solar cells on a chip that's a tenth of an inch in diameter and barely one-thousandth of an inch thick, they're still crude and subject to further refinement. But keep your eye on electronic retinas. At some point you may need one—hopefully not—and it would be nice if it were all it could be, if you did.

MAIL BONDING

Reader Gary Chamberlain has come up with a suggestion for countering Microsoft's less-than-sterling behavior. We must admit it sounds pretty good—and we didn't think of it. According to Gary, Microsoft's original whine about Internet Explorer's freebie status was that everyone was on the Web. It made sense to include a browser as part of the operating environment. Gary reminds us, however, that everyone is also doing word processing and spreadsheets. By Microsoft's logic, therefore, the company should also be including Microsoft Office as part of the operating environment—for free.

It's a simple yet totally diabolical suggestion that encapsulates all the elements of ironic justice. What do you think? Send us your opinion. And while you're at it, drop Bill an e-birthday card. It's not often a human being gets to be 34 for 16 years.

MASTERS OF THEIR DOMAIN

Alice got so despondent after not hearing from "Hard Edge" readers (Bill hogs all the snail mail and refuses to forward any to California), she set up her own Internet domain—*alicehill.com*. Stop by and sign the guest book, or drop Alice and Bill an old-fashioned letter.

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CCK10PV	VGA M/M, K/BM/M, 10'	$9.95
CCK15P	VGA M/F, K/B M/M, 15'	$12.95
CCK15PV	VGA M/M, K/BM/M, 15'	$12.95

10/100Base–T Bulk Station Wire, Cat5
- 1000' 8C Cable, Unshielded, Twisted pair. 100BASE–T, high speed data and LAN applications

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- Energy Saver USB 4 Port Hub

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WUSB4B	i-blue	$19.95	$17.95/3+
WUSBB4B	$19.95	$17.95/3+

- Mini USB 2 Port Hub

WUSB2	$22.95	$21.95/2+

- 7 Port USB Hub

WUSB7	$44.95

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CUSUP	$23.95

- USB to Ethernet Adapter

CUSUE	$47.95	$44.95/2+

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CUSUM	$42.95	$39.95/2+

- USB Video Grabber

CUSUV	$79.95	$74.95/2+

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CUSADF01	$3.75

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EVA and PVC Material CD Wallet for 24, 56, 80 & 280 CD's
All EVA CD wallet are made out of weather proof material with compressed padding, reinforced edge bonding, and round corner that shows an elegant and classy style in a solid finish. It keeps CD's clean and free from dust.
- EVA material, black color.
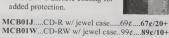
XDBCE28B	28 pcs capacity	$7.95
XDBCE56B	56 pcs capacity	$10.95

- PVC material, black color.

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XDBCP80B	80 pcs capacity	$9.95
XDBCP208B	208 pcs capacity	$19.95

Premium Blank CD-R's
- 74 minutes, 650MB on each disk.
- Treated w/ a durable coating for added protection.

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Iomega Zip Cartridges
- A single formatted cartridge.
- High data storage capacity.
- 100MB

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GZ100CM	$8.49	$7.95/2+

- 250MB

GZ250C	$15.95	$14.99/2+

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- Stores 10 CD's with colorful style.
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- Space available to store CD manual.
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XDBSWB	blue color	$5.95
XDBSWR	red color	$5.95
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XDBSWP	purple color	$5.95
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Colorful Multimedia Dome
- Stores CD's with colorful style.
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- Stores 30 CD's, 15 pcs of 3.5" FDD disk, or 10 MO disks.
- 6.4"(W) x 10"(D) x 6.1"(H).

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CD Jewel Box
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Five Per Pack

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CDCADDY CD Caddy	$3.49

CD Wallet available on Web

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- Stores keyboard under the CPU case or monitor. An easy way to save more workspace.
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- Sturdy steel case holds up to 21" monitor and desktop.
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KDMT	$15.95	$14.95/3+

Photo Mouse Pad
- Anti-static, rubber texture.
- Dimensions:8" x 9".
Fit 4" x 6" Photo, Rubber.

JMPHOTO1	Kingfish	$2.99....$1.99/5+
JMPHOTO2	Nassau	$2.99....$1.99/5+
JMPHOTO3	Cupid	$2.99....$1.99/5+
JMPHOTO4	Tiger	$2.99....$1.99/5+
JMPHOTO5	Polar Cub	$2.99....$1.99/5+

Mouse Pad

OUPB	Blue	69¢....49¢/20+
OUPG	Gray	69¢....49¢/20+
OUPR	Red	69¢....49¢/20+

Economic Monitor Arm with Keyboard Holder
XMA06
The economic monitor arm can hold up to a 17" monitor. Platform dimensions are 13.7" x 13.7" up to 66 lbs. Base clamp rotates 180°.
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- A +/- 8° tilt platform for convenience.
- Keyboard adjustable from 5° to 31°.

XMA06	$16.95	$15.95/3+

KB Wrist Rest

KBWR	Blue	
XKBWRG	Gray	$1.99

Metal Thumb Screw For Case
- Easy to use and no tools needed.
- Replace Philip's head chassis screws. 50 pcs/bag

XAK05	$12.95

Multimedia Computer Cleaner Solution
XCK08
All-in-one cleaning solution. Extensive in application for all computer peripherals, OA business machines, telephone, and much more.

XCK08	$11.95	$9.95/3+

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building a
PC
from
scratch

by
brian bennett

if you consider yourself a computer hobbyist, you've tinkered with your PC, upgrading components in an attempt to keep pace with ever-faster desktops. But there comes a time in every system's life when its motherboard just won't support current hardware choices. When this happens, you could easily order a fully configured box from one of many reputable vendors. But why settle for a system that's almost perfect when you can have exactly what your heart desires?

If you've got even a little technical knowledge under your belt, building a PC from scratch using the specific parts you crave is no sweat. What's more, you'll get a lot of satisfaction from the knowledge that you built it yourself, and you'll know your PC like the back of your hand.

Before you tackle a project this big, it's a good idea to map out your plan of attack in advance. Make sure you get all the necessary components and cables ahead of time so you don't get caught short. Have a Phillips-head screwdriver and a pair of long-nose pliers on hand, too. A Windows 98 CD-ROM and a Windows 98 startup disk on a floppy are also essential.

This month we set out to construct our own PC using quality components, but nothing so high-end that it would price the system right out of our budget. The game plan we followed is straightforward and should serve as a basic guide for your project. We decided to use the monitor, keyboard, mouse, and speakers from our original desktop, so that we could focus on the real meat and potatoes—building a solid system box. We ordered many of our parts through Arizona-based reseller TC Computers (*www.tccomputers.com*). Because TC's virtual store has such a wide selection, it can easily be a one-stop source.

step 1 For our system, we chose an Enlight EN-7237 midtower case ($78.99 from TC). It's got plenty of expansion room, accommodates ATX motherboards, and has a 300-watt power supply. Our selected ATX motherboard was an Abit VT6X4 Slot 1 board, populated with a 733MHz Pentium III CPU and fan. TC sells the motherboard/CPU bundle for $449. We also ordered a 128MB 133MHz Corsair SDRAM module ($159.99) from TC, and inserted it into the board's SIMM socket after we grounded our fingers against the metal power supply to avoid static discharge.

Here's how the system we built from scratch stacks up against our benchmark reference system.

We removed the case's front bezel and two side panels, lowered the motherboard into the case, and screwed it into place. We made

sure that the processor-fan power cable was connected to the motherboard, the case fan was attached to the power supply, and the RAM and CPU were securely seated. Following the motherboard's instruction manual, we attached the power supply to the motherboard's main power socket and linked up the case's five LED and switch cables to the appropriate jumpers on the motherboard.

step 2 To minimize potential problems, we initially installed only those drives necessary to get Windows 98 up and running: the floppy drive, the hard drive, and the DVD-ROM drive. We placed our new 3.5-inch floppy drive ($12.99 from TC) into the floppy bay,

connected the floppy interface cable to the motherboard's floppy connector and the drive, and attached the drive's power connector. [**Alt**]ernate You can probably use your old PC's floppy drive to save a few bucks.

Our hard drive was a $280 40GB DiamondMax Plus from Maxtor Corp. *(www.maxtor.com)*. We made sure the jumpers were set to "master," then positioned the drive in the case's internal bay. After plugging the ATA/66 interface cable into the drive and the motherboard's primary IDE channel, we connected the power lead.

Our final acquisition from TC was a Creative Labs PC-DVD 8X

DVD-ROM drive ($146.99). We set the drive's jumper to the "master" position (a setting we would need to change later, in step eight), mounted sliding guide rails (which came with the Enlight case) onto either side of the drive, and slipped the drive into the case's topmost drive bay. The drive didn't come with an interface cable, but fortunately, the motherboard did. We attached one end of the interface cable to the motherboard's secondary IDE channel and the other to the drive, then plugged in the drive's power supply. (With the robust CPU and graphics card we chose, we didn't need a dedicated hardware DVD decoder.) We then screwed all of the drives into place.

[**Alt**]ernate You can probably migrate over your existing IDE CD-ROM drive to save a few dollars, then replace it with a DVD-ROM drive in the future.

step 3 Next up was the Hercules Guillemot 3D Prophet II GTS graphics card ($299.99), which is based on the speedy nVidia GeForce2 GTS graphics processor. First, we had to remove a temporary metal flap from the back of the case, which covered the backplane section of the expansion slot.
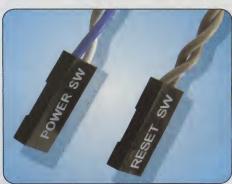
Before we could insert an expansion card, we had to remove a temporary flap covering the backplane of the case.

Here's where those pliers came in handy—for every expansion card we inserted, we had to remove these metal flaps. After locating the motherboard's AGP slot, we firmly seated the card into the slot and screwed the card's backplane to the chassis.

[**Alt**]ernate If you don't need screaming 3D graphics, you might be able to get by with your original graphics card.

step 4 With the minimum components in place for installing Windows 98, we were ready to power up the system. Leaving the case open, we plugged in the monitor, connected the keyboard and mouse, and plugged the system's power cable into the wall outlet.

The case manufacturer accidentally switched the labels of the power and reset cables.

We pressed the power button—and nothing happened. We pushed it again—still nothing. We pressed the reset button and the power light lit, the fans started to spin, but nothing else happened.

online resources

You can find great bargains on PC components if you know where to look. It's worthwhile to investigate as many e-tailers as possible. For starters, check out TC Computers *(www.tccomputers.com)*, where we were able to obtain many of our parts at great prices. Outpost.com is also a must-visit because of its free-shipping policy, and don't forget Computers4Sure.com, a shopping site that won a September 2000 Best Site award. Also check out ZDNet's Help and How-to Section *(www.zdnet.com/zdhelp)* for upgrade and tune-up tips. ▼

We were puzzled. We shut the system down (using the reset button) and investigated.
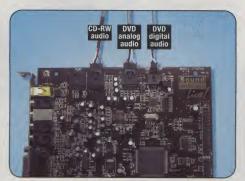
We realized that the floppy drive's cable was inserted incorrectly because a plastic knob on the cable's connector was in the way. We removed the extraneous piece of plastic and correctly inserted the cable. After snooping around further, we discovered that the case's reset and power-button cords were labeled incorrectly (thankfully, these cables are also color-coded), and we switched them to their correct positions.

With all that sorted out, we tried again. Our system successfully booted up (using the power switch), and we were able to enter the BIOS. From there we had to enable the Auto setting for both IDE controllers and enable AGP-4X Mode. We also had to disable the OnChip Sound setting, so it wouldn't conflict with the sound card we were planning to install in step seven.

step 5 A PC without an operating system is just a pricey paperweight, so installing Windows 98 was our next task. We booted up the system with the Windows 98 startup disk in the floppy drive. Once we were greeted by the DOS prompt, we confirmed that the boot disk's universal CD-ROM drivers successfully recognized the DVD-ROM drive, then used FDISK to format the hard drive. We inserted the Windows 98 CD into the DVD-ROM drive, launched Setup, and followed the onscreen prompts for installing the operating system.

step 6 Once we confirmed that Windows 98 was installed and running properly, we were able to proceed with installing the remaining device drivers and components. Since Windows had loaded the default SVGA driver for the graphics card during setup, we deleted its entry in Device Manager and rebooted the system. When Windows started up the next time, it detected the graphics card and gave us the option to install a driver from the card's installation disk. We also made sure to install the graphics card's DVD movie player software and the motherboard's 4x AGP and ATA/66 drivers.

step 7 Our Creative Labs Sound Blaster Live MP3 sound card ($99) was next. We inserted it in one of the motherboard's five PCI slots and screwed the card's backplane to the chas-

sis. We then connected the DVD-ROM drive's CD-audio cable to the sound card's AUX line. For the digital audio channel, the DVD-ROM drive was linked to the sound card by an S/PDIF digital cable. We then installed the sound card's drivers from its included CD-ROM.

[Alt]ernate Another way to save a few bucks is to use your existing sound card, but you'll likely give up some additional functionality, such as 3D sound support.

step 8 To equip our system with removable storage, we ordered an HP CD-Writer Plus 9310i CD-RW drive ($299). First, we screwed rails to the sides of the drive, switched the DVD-ROM's jumpers to the "slave" position, made sure the CD-RW drive's jumpers were to set to "master," and placed the drive in the middle 5.25-inch bay. We connected the CD-RW drive to the motherboard's secondary IDE channel, using the same cable the DVD-ROM drive was already using, so that both drives were daisy-chained together. We linked the CD-RW drive to the sound card's CD-audio connector with a CD-audio cable, and attached a power-supply lead to the drive. Then we installed the CD-RW drive's bundled applications.

The DVD-ROM and CD-RW drives slide in and out using guide rails, while the floppy drive is screwed into place.

step 9 The last component added was a 3Com U.S. Robotics 5610 56K PCI fax modem ($99.95). We fit it into one of the system's PCI slots, screwed it in place, let Windows auto-detect the card, and then installed 3Com's drivers from the bundled floppy disk.

[Alt]ernate As long as your old system has a 56Kbps modem, you can probably move the old modem to the new system.

MISSION ACCOMPLISHED

Breathing a sigh of relief, we buttoned up the system case, replaced the front bezel, and admired a job well done. Our new PC operated perfectly and cost us a total of $1,925.90. A similarly configured system from a direct vendor would probably cost about $200 to $300 less. While building your own PC may not save you money

Our finished system with all the components in place

over buying a new system (depending on how many of your old components you migrate over), you'll gain the confidence and pride that only come from hands-on experience. ▼

ALFRED POOR'S
computer cures

ALFRED POOR

E-MAIL E-MERGE?

Dear Alfred:

I have been trying to figure out how to send e-mail to several people so that it appears to each recipient that he or she is the only one receiving the message. The CC and BCC features don't do it.

Homer Bolton

Your standard e-mail programs, such as Microsoft Outlook or Netscape Communicator's Messenger, can't do what you want, but other mailing programs can. Go to ZDNet Downloads *(www.zdnet.com/downloads)*, search for "e-mail merge," and you'll find lots of mail-merge utilities. These programs can pull names and addresses from a database or spreadsheet file. Some even let you customize your messages for each individual.

OUT-OF-CONTROL PANEL

Dear Alfred:

I recently opened Control Panel, and my system froze, forcing me to use the computer's reset button. Now the system freezes at random times, especially when I try to go online. I don't see any conflicts in Device Manager. Do you have any thoughts as to what's wrong?

Rudy Luttich

It may only be a coincidence that the problem started after opening Control Panel; you might have a component that's marginal or failing. Start by making sure that all your expansion cards and memory modules are properly seated.

Next, make sure that the Windows system files are not corrupted. Choose Start/Programs/Accessories/System Tools/System Information, and then under Tools, choose System File Checker. This should restore any Windows 98 files that may have become damaged.

Finally, you could also extract fresh copies of the CPL (Control Panel) files, in case one of them has become corrupted. The basic Control Panel files are stored on the Windows 98 CD in the file WIN98_28.CAB. To copy these files to your hard drive, you need to run EXTRACT.EXE, which can be found in the root folder of the Windows CD. Copy this program to the root folder of your C: drive, then open a DOS window and type the command

    extract d:\win98_28.cab *.cpl /l
    c:\windows\system

assuming that D: is your CD-ROM drive.

PURGE PREVENTION

Dear Alfred:

My computer has been in the shop for repairs for two weeks, and while the system has problems, the hard drive is fine. I've set the options in Outlook to purge e-mails after five days. If I attach this hard drive as a slave to another computer and fire it up, will my e-mails automatically disappear?

Nancy Forster

If Outlook is installed on the other computer, there is a good chance that it will erase the older messages. Before you run Outlook, make a backup copy of your Outlook files from the old drive, just in case. Then change the system date of the new machine so that it is set to the day the old system went into the shop. You should be able to open the old files and recover your mail, before you give Outlook a chance to purge the messages.

UNSTOPPABLE SCANDISK

Dear Alfred:

Whenever I run either ScanDisk or Disk Defragmenter, they restart about 10 times but never report a problem. What's happening?

Jeannette Harms

It may be that another program is running that is changing the disk's contents while these utilities are trying to do their work. One of the leading culprits is FastFind, which is part of Microsoft Office. Turn off FastFind, and you may find that ScanDisk and Disk Defragmenter can complete without restarting. ▼

tip of the month

WRITE RIGHTS

Is your data backed up? What happens when you restore it? Are you sure that it's going to do what you expect? This month's Tipster discovered a sneaky little problem.

Dear Alfred:

Inexpensive CD-RW drives make it easy and practical to back up hard drives to a rewritable CD. I recently had to restore some application files from a backup disc, but the programs didn't run correctly. I discovered that the program files had been set to Read Only, so they weren't written over when I did the restore. So always check the attributes of files that you intend to replace during a restore.

Rich Gordon

That's a good point. You can check the attributes of a file in Windows Explorer by setting the View to Details, and looking in the column to the right of the Modified column. An R indicates that the file is Read Only. You can change the attributes for a file by right-clicking on the filename in Explorer and choosing Properties. On the General tab, you'll find checkboxes for the attributes.

Send us your favorite tip, and you could receive a Tipster's prize package, including a coveted "Computer Cures" T-shirt, plus some *other secret and* exciting items that you can't get anywhere else! Send your questions and tips to:

"Alfred Poor's Computer Cures"
Computer Shopper, Editorial Dept.
28 E. 28th St., 10th Fl.
New York, NY 10016-7922
apoor@zdnet.com

Please include your name. Sorry, we cannot provide personal replies, nor return any enclosures.

ILLUSTRATION BY PAUL VISMARA

SUPER-7 AGP Motherboards with 100MHz BUS

VA-503+ — FIC — $75
- VIA Apollo MVP3 AGPset
- 100MHz BUS Speed
- 1MB Pipeline Burst Cache
- Baby AT Size: 9.2" x 8.6"

AMD K6-2 3DNOW Technology
K6-2 500	145
K6-2 550	189

PA-2013 — FIC — $79
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- 100MHz BUS Speed
- 1MB Pipeline Burst Cache
- ATX Form Factor: 12.2" x 8.12"

AMD K6-2 3DNOW Technology
K6-2 500	149
K6-2 550	199

VA-503A — FIC — $89
- VIA Apollo MVP3 + Super South Chipset
- 1MB Pipeline Burst Cache, IDE Ultra DMA/66 Integrated Audio/DirectSound audio
- AMR (Audio/Modem Riser)
- Baby AT Size: 8.5" x 9.5"

AMD K6-2 3DNOW Technology
K6-2 500/550	159/199

S1598 TRINITY 100 — TYAN — $95
S1590 $88
- VIA Apollo MVP3 AGPset
- 100MHz BUS Speed
- 1MB Pipeline Burst Cache
- IDE ULTRA DMA66
- TRINITY ATX: 12.0" x 8.3"

AMD K6-2 3DNOW Technology
K6-2 500/550	169/209

ASUS P5A — ASUS — $94
P5AB $91
- Ali M1541 Aladdin V AGPset
- 100MHz BUS Speed
- 512k Pipeline Burst Cache
- ATX Form Factor: 8.3" x 12.0"

AMD K6-2 3DNOW Technology
K6-2 500	169
K6-2 550	209

AMD Athlon K7™ Motherboards

A7V — ASUS — $159
- Support Single AMD Socket A processor
- (1) AGP, (4) PCI slots
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- **1GHZ $719**

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900/950MHz	479/539

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New AMD K7 Thunderbird™
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900/950MHz	439/539

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- Support Single AMD Socket A processor
- (1) AGP, (5) PCI, (1) ISA slots
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- **1GHZ $669**

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600/650/700MHz	209/219/249

New AMD K7 Thunderbird™
700/750/800/850MHz	299/319/339/399
900/950MHz	439/539

S2380 TRINITY — TYAN — $109
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- ATX Size: 8.2" x 12.0"
- **1GHZ $659**

New AMD K7 Thunderbird™
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800/850MHz	319/379
900/950MHz	419/519

K7V — ASUS — $129
- Support Single AMD Athlon K7 500-850+
- (1) AGP, (5) PCI, (1) AMR slots
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- **1GHZ $679**

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700/750MHz	299/319
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900/950MHz	439/539

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- VIA Apollo Pro 133A Chipset
- SUPPORT Single Slot 1/Socket 370 CPU
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- ATX Form Factor: 12.0" x 8.3"

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Intel® Celeron® Processor with 128K Cache
566/600/633/700MHz	185/195/225/265

Intel® Pentium® III Processor
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VC820 w/sound — intel — $155
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- Two 184-pin RIMM Sockets
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- New Intel® i815 "Solano" Chipset
- SUPPORT Single FCPGA CPU
- 133MHz FSB (Front System Bus)
- (3) 168-pin DIMM sockets
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Intel® Pentium® III Processor 133FSB
667/733/800MHz	395/405/445
866/933MHz	565/735

Intel® Celeron® Processor with 128K Cache
566/600/633/700MHz	245/255/275/315

Intel® Pentium® III Processor
700/750/800/850MHz	395/410/435/555

P6VAP-A+ — ECS — $95
- VIA Apollo Pro 133A Chipset
- SUPPORT Single Slot 1/Socket 370 CPU
- 133MHz FSB (Front System Bus)
- ATX Form Factor: 12.2" x 8.8"

Intel® Pentium® III Processor 133FSB
667/733MHz	315/335
800/866/933MHz	375/500/665

Intel® Celeron® Processor with 128K Cache
566/600/633/700MHz	175/185/205/255

Intel® Pentium® III Processor
700/750MHz	325/355
800/850MHz	365/485

1834-D TIGER — TYAN — $169
- VIA Apollo Pro 133A Chipset
- SUPPORT DUAL Slot 1
- 133MHz FSB (Front System Bus)
- (4) 168-pin DIMM sockets
- ATX Form Factor: 12.0" x 8.2"

Intel® Pentium® III Processor
667/733/800MHz	390/400/445
866/933MHz	565/735

SUPPORT DUAL PENTIUM-III 133FSB CPUs
(2) 667/733MHz	620/645
(2) 800/866MHz	735/975
(2) 933MHz	1295

CUV4X — ASUS — $120
- VIA 694x/694z Chipset
- SUPPORT Single FCPGA CPU
- 133MHz FSB (Front System Bus)
- (3) 168-pin DIMM sockets
- ATX Form Factor: 12.0" x 8.2"

Intel® Pentium® III Processor 133FSB
667/733MHz	345/365
800/866/933MHz	415/535/700

Intel® Celeron® Processor with 128K Cache
566/600/633/700MHz	205/215/245/285

Intel® Pentium® III Processor
700/750/800/850MHz	355/395/405/525

CUSL2 — ASUS — $155
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- SUPPORT Single FCPGA CPU
- 133MHz FSB (Front System Bus)
- (3) 168-pin DIMM sockets
- ATX Form Factor: 12.0" x 8.2"

Intel® Pentium® III Processor 133FSB
667/733MHz	395/405
800/866/933MHz	445/565/735

Intel® Celeron® Processor with 128K Cache
566/600/633/700MHz	240/250/280/320

Intel® Pentium® III Processor
700/750/800/850MHz	395/405/435/555

P3V4X — ASUS — $125
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370SSM — SUPERMICRO — $125
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P6DBU — SUPERMICRO — $399
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- Intel 82559 Ethernet Controller
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933MHz	1085

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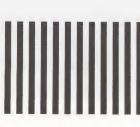
DOUBLE BONUS:

BUYING ADVISOR

by Asa Somers

Language Lessons Via Web Cam

Finding affordable hardware, software, and a fast Net connection to link a language instructor in Honolulu with her students in Tokyo

HOLDING REMOTE CORPORATE meetings was initially seen as the primary use for videoconferencing. But now that broadband access and inexpensive Web cams are taking this technology mainstream, independent entrepreneurs are starting to consider videoconferencing a compelling business tool.

Consider Jane Webb, a retired American expatriate living in Tokyo who teaches English to Japanese executives. Now that she's moving to Honolulu, she wants to take her part-time enterprise with her.

But her students require some face time, because demonstrating the proper method for producing spoken English and fine-tuning an accent are processes that are equally visual and aural, she says. "Videoconferencing suggested itself as a means to continue the kind of language tutoring that I have been doing. I need the best video and speech capability that can be had, for the best dollar."

We immediately advised Webb that even with a DSL or cable modem mainlining data into her computer, video phone calls suffer from substantial graininess and herky-jerky frame rates. Nonetheless, some video is better than none at all.

Webb already has a notebook that's capable of videoconferencing, a new $2,495 Sager 3360V outfitted with an 800MHz Pentium III processor, 256MB of RAM, a 14-inch screen, and an ATI Rage LT Pro AGP graphics subsystem with 8MB of SGRAM. Beyond that, she'll need a high-speed connection, videoconferencing software, a desktop video camera, and a microphone.

Perhaps the most critical for both Webb and her students is a fast Internet connection. In Honolulu, we found a number of companies providing residential *DSL* service. **Hawaii Internet Technology Solutions** served up the best deal, with a monthly charge of $77.50. **Road Runner** cable-modem service is also available in many parts of town, and at $49.95 monthly, it's an even better deal (although Webb would have to pay an additional $150 for installation of the modem and network interface card). At this point, however, Webb isn't quite sure where she'll be living,

▶ CHALLENGE

USER PROFILE

Jane Webb, an American who teaches English as a second language to Tokyo executives.

COMPUTING NEEDS

A fast Internet connection, capable videoconferencing software, and an easy-to-use Web cam.

so she'll have to contact the ISPs when she arrives to find out if broadband is available in her neighborhood.

The second thing to consider is videoconferencing software. There are two main options: **Microsoft NetMeeting,** which is available for free at *www.microsoft.com/windows/netmeeting* (it's also bundled with most new computers and Web cams), and **CUseeMe Pro,** which costs $69 when you download it from the company's Web site (*www.cuseeme.com*).

The two programs are similar; both offer extras

The Intel PC Camera Pro Pack

like whiteboard functionality, text chat, and application sharing. Although CUseeMe is the only program to support multiuser conferencing sessions of up to 12 participants, NetMeeting generally offers smoother video in one-on-one sessions. Given the price differential, we'd go with NetMeeting.

Next up: the Web cam. Things to consider include ease of use, bundled software, and image quality. There's no shortage of promising candidates. One good choice is 3Com's **HomeConnect,** a USB-based camera that handles up to 1,280x960 resolution and is known for its smooth video and ease of use. It's also backed by a five-year parts-and-labor warranty and ships with a 9-foot cable that detaches from the back of the camera for easy setup and breakdown. We found the device online for $118.75 at firstsource.com *(www.firstsource.com)*.

Ezonics' **EZDual Cam** is another highly rated product, one that doubles as a stand-alone still camera. We found it for $123 at auction on Egghead *(www.egghead.com)*. The camera comes with lots of great software but only a one-year warranty.

The **Intel PC Camera Pro Pack** might be Webb's best bet. Like the others, it offers USB connectivity and features a snapshot button for taking digital stills. It comes with a 9-foot cable, and its image quality and videophone software bundle are critically acclaimed. We found the Intel PC Camera Pro Pack for $94.95 plus shipping at buy.com *(www.buy.com)*. An optional clip for mounting the camera on a laptop bezel is available directly from Intel for $10.

Any of these three cameras would fit Webb's needs, but we're giving the nod to the Intel product. It's less expensive, provides high-quality pictures, and offers some pretty sweet features. With

SOLUTION

THE ADVISOR'S CHOICE

In Honolulu, the best deal on broadband Net access is a cable modem from **Road Runner**, at a cost of $49.95 per month plus $150 for installation and a network interface card. An even better deal is **Microsoft NetMeeting** conferencing software, which is available free. As for the camera, the **Intel PC Camera Pro Pack** fuses great hardware and software in a package priced at only $94.95.

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For real-time pricing, go to *priceit.zdnet.com* and enter number.

NetMeeting and a broadband Internet account, Webb will likely have about as good a videoconferencing experience as can be expected, given the current state of the technology.

If you want help making a smart buying decision, e-mail the Buying Advisor at **buying_advisor@zdnet.com.**

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Slot 1 & Socket 370 Motherboard Comparison

Motherboard	Supported Bus Speed	Chipset	370 Socket	Slot 1 Socket	Max. CPU Supported	Max. Memory	UDMA 33/66	AGP/PCI/ISA Slots	On-board LAN/Modem	On-board Audio/Video	Item #	Qty 1-2 Price
Soyo MB2-6KBE	66	Intel LX	No	Yes	400 Celeron/PII 333	512	33	1/4/3	No/ No	No/ No	MB2-6KBE	$49.99
EDOM W6BXV	66/100	Apollo Pro Plus	No	Yes	600 Celeron/PII 450	768	33	1/4/3	No/ No	No/ No	MB2-W6BXV	$49.99
Diamond C400	66/100	Intel BX	No	Yes	700PIII/600 Celeron	768	33	1/5/2	No/ No	No/No	D55-C400	$49.99
Soyo SY-7SSB	66/100	SiS 600	Yes	No	600 Celeron	768	33	1/3/2	No/ No	No/No	S450-1065	$59.99
PC Chips M726LMRT	66/100	BXcel	Yes	Yes	700PIII/600 Celeron	768	33	1/3/1	Opt./Opt.	Yes/No	D75-726MRT	$59.99
Pine SB1-A	66/100	SiS 5600	No	Yes	700PIII/600 Celeron	768	33	0/3/2	No/ No	Yes/No	P450-2000	$69.99
ECS P6BAP-A+	66/100/133	VT82C693A	Yes	No	800PIII/600 Celeron	768	66	1/4/2	No/ No	Yes/ No	MB2-P6BAP	$69.99
Pine SB3-AV	66/100	SiS620	Yes	No	600 Celeron	768	66	0/3/2	No/ No	Yes/Yes	P450-1025	$79.99
Pine PM-FO1A	66/100	Intel BX	Yes	No	800PIII/600 Celeron	768	33	1/5/2	No/ No	No/No	P450-1005	$82.99
Pine SM3-AV	66/100	SiS 620	Yes	No	700PIII/600 Celeron	768	66	0/3/1	No/ No	Yes/Yes	P450-1030	$84.99
ECS P6STP-FL	66/100/133	SiS 630E	Yes	No	800PIII/600 Celeron	1024	66	1/2/0	Opt./ Opt.	Yes/Yes	MB2-P6STPFL	$84.99
Luckytech P694A	66/100/133	Apollo Pro 133	Yes	Yes	800PIII/600 Celeron	768	66	1/4/1	No/ No	Yes/ No	L451-1000	$86.99
Pine BA-1	66/100	Intel BX	No	Yes	700PIII/600 Celeron	768	33	1/4/3	No/ No	No/No	P450-3000	$89.99
FIC FA-13	66/100/133	Via Apollo 133	Yes	No	933PIII/600 Celeron	1024	66	1/5/2	No/ No	Yes/No	L450-1060	$89.99
SoyoSY-6VBA 133	66/100/133	Via Apollo 133	No	Yes	800PIII/600 Celeron	1024	66	1/5/2	No/ No	No/No	S450-1010	$92.99
Gigabyte GA-6VXE7+	66/100/133	Via Apollo 133	Yes	No	800PIII/600 Celeron	768	66	1/5/2	No/ No	No/ No	L450-4021	$94.99
Soyo SY-7VBA 133	66/100/133	Via Apollo 133	Yes	No	800PIII/600 Celeron	768	66	1/5/2	No/ No	Yes/ No	S450-1060	$99.99
FIC FB-11	66/100	Intel BX	Yes	No	800PIII/600 Celeron	1024	33	1/5/2	No/ No	No/ No	L450-1050	$101.99
FIC FA-11	66/100/133	Via Apollo 133	Yes	No	933PIII/600 Celeron	1536	66	1/5/1	No/ No	Yes/No	L450-1055	$107.99
Gigabyte GA-6VX7-4X	66/100/133	Via Apollo 133	Yes	No	800PIII/600 Celeron	1536	66	1/5/1	No/ No	Yes/ No	L450-4022	$109.99
Soyo SY-7VCM	66/100/133	Via Apollo 133	Yes	No	800PIII/600 Celeron	1024	66	1/3/0	No/ No	Yes/No	S450-1055	$114.99
Soyo SY-6VCA	66/100/133	Via Apollo 133	No	Yes	800PIII/600 Celeron	1536	66	1/5/1	No/ No	Yes/No	S450-1011	$116.99
Soyo SY-7VCA-133	66/100/133	Via Apollo 133	Yes	No	800PIII/600 Celeron	1536	66	1/5/1	No/ No	Yes/ No	S450-1050	$119.99
Pine BA-1D	66/100	Intel BX	No	Dual	700PIII/600 Celeron	1024	33	1/5/2	No/ No	No/No	P450-4000	$169.99

Socket 7 Motherboard Comparison

Motherboard	Chipset	Supported Bus Speed 33/66	UDMA	Cache Supported	Max. CPU SIMM/DIMM	Memory Slots	AGP/PCI/ISA LAN/Modem	On-board LAN/Modem	On-board Audio/Video	Item # Price	QTY 1-2
Diamond C200	Aladdin V	66/75/83/95/100	33	512KB Cache	500MHz	0/768	1/4/3	No/No	No/No	D55-C200	$49.99
Soyo 5EMA+	ETEQ 6629	66/75/83/90/95/100	33	1MB Cache	550MHz	0/768	1/5/2	No/No	No	S450-1035	$64.99
PC Chips M-571LMR	TX Pro II	60/66/75	33	512KB Cache	366MHz	0/512	0/3/2	Opt/Opt	Opt/Opt	MB2-571LMR	$69.99
Soyo SY-5EH/5	ETEQ 6639	66/75/83/95/100	33	512KB Cache	550MHz	0/768	1/3/3	No/No	No/No	S450-1045	$77.99
FIC VA-503+	Via MVP3	66/75/83/95/100	33	1MB Cache	550MHz	512/512	1/3/3	No/No	No	L450-1000	$79.99
PC Chips M-598LMR	SiS 530	66/75/83/95/100	33	1MB Cache	550MHz	0/768	0/2/1	Opt/Opt	Yes/AGP	MB2-598LMR	$82.99
PC Chips MS-599LMR	SiS 530	66/75/83/95/100	33	1MB Cache	550MHz	0/768	0/2/1	Opt/Opt	Yes/AGP	MB2-599LMR	$82.99
Gigabyte GA-5AA	Aladdin V	66/75/83/95/100	66	512KB Cache	550MHz	0/768	1/3/2	No/No	No/No	L450-4000	$84.99
Gigabyte GA-5AX	Aladdin V	66/75/83/95/100	66	512KB Cache	550MHz	0/768	1/5/2	No/No	No/No	L450-4010	$85.99
Soyo SY-5SSM-5	SiS530	66/75/83/95/100	66	512KB Cache	550MHz	0/768	0/4/1	No/No	Yes/No	S450-1040	$88.99
FIC VA7-AV	Via MVP4	66/75/83/95/100/124	66	512KB Cache	550MHz	0/768	0/5/2	No/No	Yes/AGP	P450-5000	$89.99

Socket A & Slot A Motherboard Comparison

Motherboard	Chipset	Supported Bus Speed	Socket A	Slot A	Duron Support	Ultra ATA/66 Support	Max. CPU Supported	Max. Memory DIMM	AGP/PCI/ISA Slots	On-board LAN/Modem	On-board Audio/Video	Item #	QTY 1-2 Price
Luckytech P6K7A	Via KX-133	200	No	Yes	No	Yes	1GHz	768	1/5/1	No/No	Yes/No	L451-2000	$99.99
Gigabyte GA-7IXE	AMD 751	200	No	Yes	No	Yes	1GHz	768	1/5/2	No/No	No/No	L450-4040	$104.99
Soyo SY-K7VIA	Via KX-133	200	No	Yes	No	Yes	1GHz	768	1/5/1	No/No	No/No	S450-2000	$112.99
Microstar K7-Pro	AMD 751	200	No	Yes	No	Yes	1GHz	768	1/6/1	No/No	No/No	MB2-K7PRO	$115.99
PC Chips M-800LMR	AMD 751	200	No	Yes	No	Yes	1GHz	768	1/4/0	Yes/Opt.	Yes/No	MB2-M800LMR	$119.99
FIC AZ11	Via KT-133	200	Yes	No	Yes	Yes	1GHz	1536	1/5/0	No/No	Yes/No	L450-1040	$142.99
Gigabyte GA-7ZX	Via KT-133	200	Yes	No	Yes	Yes	1GHz	1536	1/5/0	No/No	Yes/No	MB2-7ZX	$146.99

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12-24Gig	DDS-3, 120MB/min, C1554AI	$695 $20 (DAT125M)
20-40Gig	DDS-4, 180MB/min, C5686A	$1079 $45 (DAT150M)
72-144Gig	DDS-3, 120MB/min, C5648A	$1659 $20 (DAT125M)

Seagate
We include 5.25" mounting hardware with Seagate DAT!

2-4Gig	DAT-DC,66MB/min,STD24000N	$419 $8 (DAT90M)
4Gig	Mini, 30MB/min,STT28000N	$225 $24 (TRA)
4-8Gig	Mini, 60MB/min,STT28000NC	$349 $24 (TR4)
4-8Gig	DDS-2 DAT, 66MB/min, STD28000N	$499 $9 (DAT120M)
10-20Gig	Mini, 100MB/min,STT2200BARE	$279 $41 (TR5)
20-40Gig	DDS-4 DAT, 330MB/min, STD2401LW	$919 $45 (DAT150M)
12-24Gig	DDS-3 DAT, 132MB/min, STD224000N	$689 $9 (DAT120M)
35-70Gig	AIT,360MB/min, STA2701W	$1759 $150 (STAE70)
48-96Gig	DDS-2 DAT, 66MB/min, STL496000N	$1599 $20 (DAT125M)

TAPE BACKUP

SONY
We include 5.25" mounting hardware with Sony DAT!

4-8Gig	DDS-2 DAT, 90MB/min, SDT7000AI	$519 $9 (DAT120M)
12-24Gig	DDS-3 DAT, 144MB/min, SDT9000AI	$679 $20 (DAT125M)
20-40Gig	DDS-4 DAT, 288MB/min, SDT11000AI	$969 $45 (DAT150M)
160-320Gig	DDS-4 DATloader, 840MB/min, TSL-S11000	$2559 $45 (DAT150M)

Quantum.
Get a DLT4 tape for only $65 when purchased with drive.

20-40Gig	DLT,180MB/min, DLT4000	$1279 $65 (DLT4)
	External, our case, DLT4000X	$1379 $65 (DLT4)
	External, Quantum case, DLT4000QX	$1539 $65 (DLT4)
40-80Gig	DLT, 600MB/min,DLT8000	$3799 $65 (DLT4)
	External, our case, DLT8000X	$3899 $65 (DLT4)
	External, Quantum case, DLT8000QX	$3939 $65 (DLT4)

DLT MEDIA SALE	1-4	5-9	10-49	50+
DLTIII 10-20GB (DLT3)	$36	$34	$32	$30
DLTIII XT 15-30GB (DLT3XT)	$39	$36	$34	$33
DLTIV 20-40GB (DLT4)	$69	$67	$65	$64
DLT Cleaning tape (DLTCLEAN)	$40	$39	$36	$35

HOT TAPE DRIVES
New Advanced Digital Recording (ADR) tape drives offer an excellent value. These drives store 15GB native or up to 30GB of compressed data. And they include awesome backup software. It even includes a "drag and drop" software that allows you to use this drive as a standard disk drive under Windows.

15-30GB internal IDE w/software (OS3OIDE)	$275
15-30GB internal SCSI w/software (OS3OSCSI)	$435
25-50GB internal SCSI w/software (OS5OSCSI)	$515
25-50GB internal SCSI LVD w/software (OS5OLVDI)	$579
70GB internal SCSI LVD w/software **Coming Soon!**	$Call
Tapes for above 15-30 (ADR30) / 25-50 (ADR50)	$35/$45

SONY AIT Tape Drive
25-50GB	AIT Internal	(SDX-300CI)	$1595
25-50GB	AIT External	(SDX-S300C)	$1999
50-100GB	AIT-2 Internal	(SDX-500CI)	$2929
50-100GB	AIT-2 External	(SDX-S500C)	$3369

AIT Media				
35GB (SDX135C)	1-4 $89	5-9 $87	10-49 $85	50+ $80
50GB (SDX250C)	1-4 $129	5-9 $125	10-49 $120	50+ $115

We appreciate your business!

BACKUP SOFTWARE

Seagate (formerly Veritas) (formerly Seagate) Backup Exec
Windows 95 & 98 (SBEWDWD)	$69
Windows NT workstation (SBENTWD)	$69
Windows NT/2000 Exchange Server Agent (SBENTEX006)	$495
Windows NT/2000 SQL Agt E/F/G/S/I (SBENTSQ0007)	$565
Windows NT/2000 Server En (SBENTSR0000)	$569
Small Business Server Suite (SBENTSB)	$429
Netware single server & unlimited users (SBENWSE)	$449
Netware multi server (SBENWME)	$829

NovaStor
NovaBack CD contains backup software for DOS, Win 3.1, Windows 95, Win NT, and OS/2 Compatible with SCSI, IDE, and QIC drives (19801) $55

NovaBackup for Windows NT/2000
Server (29801)	$125
Workstation (29821)	$59

NovaNet 8 for Windows
SE for Windows NT/2000 (79210)	$299
Single Server for NT/2000 (79230)	$415
Unlimited for NT/2000 (79250)	$715

NovaNet 8 for NetWare
SE (79310)	$319
Single Server for NetWare 25 User (79320)	$339
Single Server for NetWare 1000 User (79330)	$419
Unlimited for NetWare 25 User (79340)	$589
Unlimited for NetWare 1000 User (79350)	$689

MicroSolutions
Microsolutions offers a complete line of plug and play external drives. These drives easily interface with your computer's parallel printer port. They also have a pass through connector so you can use your printer at the same time.

32X CD-ROM	#BACKPAC32X	$165
32X CD-ROM w/sound	#BACKPAC32XS	$195
8GB Hard Drive	#BACKPACK8G	$295
4x4x20 CD Rewritable	#BACKPAC4X20	$285

Quantum's Snap Server **NEW!**
Add fast and easy storage to your network with quick installation & no disruption. Avail in 10 & 20 GB. Call.
(20GB model shown)
These are one of the hottest items we have seen in years!

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DRIVES

CD MEDIA

CD RECORDABLE MEDIA

CDR-74 in jewel case

Prices just lowered again!

12x	Budget 5 pack (CDR74B-5)	$5
12x	Budget 20 pack (CDR74B-20)	$18
12x	Budget 50 pack (CDR74B-50)	$42
12x	Budget 100 pack (CDR74B-100)	$78
12x	5 pack (CDR74-5)	$6
12x	20 pack (CDR74-20)	$24
12x	50 pack (CDR74-50)	$56
12x	100 pack (CDR74-100)	$105
12x	Platinum 5 pack (CDR74PA-5)	$6
12x	Platinum 20 pack (CDR74PA-20)	$24
12x	Platinum 50 pack (CDR74PA-50)	$57
12x	Platinum 100 pack (CDR74PA-100)	$106

Printable CDR-74 in jewel case

12x	Budget 5 pack (CDR74PB-5)	$4
12x	Budget 20 pack (CDR74PB-20)	$15
12x	Budget 50 pack (CDR74PB-50)	$35
12x	Budget 100 pack (CDR74PB-100)	$66
12x	5 pack (CDR74P-5)	$7
12x	20 pack (CDR74P-20)	$26
12x	50 pack (CDR74P-50)	$62
12x	100 pack (CDR74P-100)	$115

CDR-80 80 minute media in jewel case

12x	Budget 5 pack (CDR80-5)	$4
12x	Budget 20 pack (CDR80-20)	$13
12x	Budget 50 pack (CDR80-50)	$32
12x	Budget 100 pack (CDR80-100)	$59
Bulk!	Spindle 74 minute media. Includes 50 CD-Rs (12x), No jewel cases included (CDR74S8-50)	$42
Bulk!	Spindle 74 minute media. Includes 100 CD-Rs (12x), No jewel cases included (CDR74S8-100)	$79
Bulk!	Spindle 80 minute media. Includes 100 CD-Rs (12x), No jewel cases included (CDR80S8-100)	$43
Bulk!	Spindle 80 minute media. Includes 500 CD-Rs (12x), No jewel cases included (CDR80S8-500)	$199

CD REWRITABLE MEDIA

CDR-74W in jewel case

4x	Budget 5 pack (CDR74WB-5)	$6
4x	Budget 20 pack (CDR74WB-20)	$24
4x	Budget 50 pack (CDR74WB-50)	$56
4x	Budget 100 pack (CDR74WB-100)	$104
4x	5 pack (CDR74W-5)	$12
4x	20 pack (CDR74W-20)	$45
4x	50 pack (CDR74W-50)	$107
4x	100 pack (CDR74W-100)	WOW !!! $199

Dealer Inquiries invited. Nobody beats Dirt Cheap Drives for CD Media. We are the #1 source in the US! Check out our full product line of media at www.dirtcheapdrives.com/media

SOUND ACCESSOR

Get the most sound out of your CDs! We have a massive inventory of quality computer headsets, microphones and speakers with prices starting at just $7! Here's a sampling:

PC Stereo Headphone
Designed to be lightweight and comfortable for extended use.
C105 $9

Professional Series Earphone
Designed for home stereo use, maximum in audio performance, and superior comfort.
LT825 $18

Professional Series Earphone
Designed for home stereo use, the LT830 delivers the maximum in audio performance, while offering superior comfort and listening convenience.
LT830 $21

Professional Series Earphone
Designed for portable audio and home stereo use, the LT820 delivers the maximum in sound performance while offering superior comfort and listening versatility.
LT820 $13

Stereo Headset/Boom Microphone
New comfort & fit design provides optimal voice clarity for voice command, internet communications, multi-player gaming and other multimedia applications.
C322 $20

Headset/Boom Microphone for PC Speech Recognition Applications
Designed to provide accurate audio input for speech recognition, voice command, internet communications and all other PC multimedia applications. Comfortable too!
LVA8450 $39

FlexNeck™ Microphone
Get optimal clarity for voice command, internet telephony, and other multimedia applications.
AM-252 $12

Active Series Ultra Portable Earphone
Designed specifically for active lifestyles, the LT615 headphone is lightweight, ultra portable, comfortable and delivers crisp, clear sound.
LT615 $7

High Output Hand Microphone
Provides optimal voice clarity for voice command, internet telephony, educational software and other multimedia applications.
AM222 $13

FlexiMount™ PC Microphone
Optimal clarity for voice command, internet telephony, educational software, and other multimedia applications. Features wide base stand.
AM240 $12

Computer Speakers for High Quality Music and Sound Output
Two piece multimedia design reproduces full range of sound to satisfy a wide variety of musical tastes. Brings recording studio quality sound to your desktop.
LCS1030 $55

Computer Speakers – *Award winning audio technology*
Includes digital audio streaming resulting in crystal-clear sound, free of the noise and distortion often generated inside a PC.
LCS1040 $75

Computer Speakers
World's best selling compact multimedia speaker.
LCS150 $15

Computer Speakers
Make the most of your limited desk space with this compact, ergonomic design, while enhancing your listening experience.
LCS1010 $18

Space-Saver™ Computer Speakers with Dynamic Bass Equalization
Make the most of limited desk space while enjoying great sound that makes the most of your CD-ROMS, music and games.
LCS1012 $29

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DIRT CHEAP

DRIVES

USB DRIVES & USB STUFF

SONY SONY SONY — **4x4x6 CD Rewritable for PC or Mac**
Master CD with this complete kit. Includes mastering software and drive in high quality external USB case.
#CRX100E/X2 $299

100MB Zip Drive
Iomega USB 100MB Zip drive. Easy to install, simply connect to the USB port on your system and install the included software.
#ZIP100USB $102

250MB Zip
Iomega USB 250MB Zip drive. Easy to install, simply connect to the USB port on your system and install the included software.
#ZIP250USB $169

2.2GB Orb
Revolutionary removable media storage by Castlewood Systems holds 2.2GB of uncompressed storage capacity. Includes a 2.2GB cartridge.
#ORBUSB $185

USB to SCSI Adapter
USB to SCSI adapter by Adaptec. Allows you to attach any SCSI device to the USB port. Also available in SCSI-2.
#USBSCSI $69   #USBSCSI2 $69

SuperDisk Drive 120MB & Floppy
Imation LS-120 USB drive for iMac & Blue G3 systems. Reads Mac & PC formats. Uses 1.4MB and 120MB disks.
#USBLS120 $139

1394 USB/PCI Board
2 1394 ports & 2 USB external ports for plug and play peripherals.
#70HTL00060 $139

Floppy Drive
Teac USB floppy for iMac. Reads & writes Mac and PC formats. Features iMac blue case.
#USBFLOPPY $85

10GB, 15GB, 20GB, 30GB Hard Drive
10GB USB external hard drive with built-in fan and USB cable. Cool looking translucent white plastic casing.
#USB10GB $159
#USB15GB $169
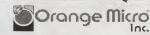#USB20GB $185
#USB30GB $229

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- High Tech Telephony Products
- Software - ALL the hottest sellers!
- 3Com Networking Devices
- Digital Cameras - Both Video and Still
- Industrial Enclosures
- Memory
- Video Equipment and more!

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1394/FIREWIRE

Hot 1394 products by Orange Micro inc.

The new 1394 interface is a high performance technology that can support up to 63 devices with current data transfer speeds up to 400Mbits per second. This hot new technology is also known as Firewire and i.Link.

1394 PCMCIA CardBus
Hot plug connect multimedia peripherals to your computer without restarting. Dual connectors support 1394 peripherals such as disk drives, scanners, printers and digital cameras.
1394 CardBus PC Card   (70HTL00040) $105

1394 USB/PCI Board
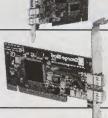2 1394 & 2 USB external ports for plug and play peripherals.
USB/PCI Board   (70HTL00060) $139

1394 PCI Board Kit
Edit video from your Mac or PC!
Mac/PC PCI Board Kit: (70HTL13941) $89

1394 Hub
Disconnect 1394 peripherals without disturbing other peripherals in a traditional daisy chain. Provides 5 additional 1394 ports from a single power supply.
1394 Hub   (70HTL00030) $85

1394 Repeater and Cables
Connect one repeater to another using 15 foot cables. Reach up to 236 feet total length from the original 1394 host system.
1394 Repeater   (70HTL00020) $45
15 Ft. Cable: 6pin to 4pin   (70CAB13943) $28
15 Ft. Cable: 6pin to 6pin   (70CAB13942) $30

CALL TODAY for current pricing & information or visit our secure website 24 hours a day at: www.dirtcheapdrives.com/1394

1394 UMAX PowerLook 1100 Scanner with DuoDesign Software Bundle
Designed for use on Macintosh or Windows PC systems equipped with a FireWire/IEEE-1394 port. The PowerLook 1100 features a high 3.4Dmax for fine details, 4MB I/O buffer, 1200 x 2400 dpi with a 10,600 element tri-linear CCD, and an effective 42-bit output.
(SPKG14006) $959

DRIVES

CONTROLLERS

adaptec

		BARE	/KIT
A1505CDKIT	ISA 16 Bit SCSI (no hard drive support)		$49
A2906EKIT	PCI 32 Bit SCSI (For PC or Mac)		$54
T1350	EPP Parallel to SCSI adapter		$69
T1460D2KIT	PCMCIA type 2, 3, or 4 to SCSI		$125
T1480A	CardBus to Ultra SCSI		$169
AAA131U2	PCI RAID controller for Ultra-2		$435
AAA133U2	PCI Ultra-2 RAID 3 channel controller		$695
ARO1130U2	RAIDPORT II Ultra-2 RAID controller		$269
A2940UKIT	PCI 32 bit Ultra SCSI controller		$229
A19160B	Ultra 160 SCSI bare card		$159
A19160	Ultra 160 SCSI controller w/SpeedFlex software		$225
A39160	Ultra 160 SCSI 64 bit PCI 2 channel		$349
A29160B	Ultra 160 SCSI bare card		$219
A29160	Ultra 160 SCSI 64 bit single channel		$299
A29160N	Ultra 160 SCSI 32 bit PCI controller		$289
APD29160MAC	Ultra 160 SCSI controller for Macintosh		$295
APD39160MAC	Ultra 160 SCSI controller for Macintosh FAST!		$395
AAAUDMAKIT	PCI 4 channel UDMA/66 RAID		$399
A29160LPB	Ultra 160 SCSI 64 bit MD2 low profile bare		$225
A29160LP	Ultra 160 SCSI 64 bit MD2 low profile kit		$315
GOBACK	Disaster Recovery Software		$59
RAID			
RAID2100S	Ultra 160 SCSI RAID w/32MB SDRAM		$439
RAID3200S	As 2100S with 2 channels, 64 bit		$729
RAID3400S	As 2100S with 4 channels, 64 bit		$979
ABM100KIT	Battery backed module for 3000S series RAID controllers		$229
AMM232KIT	32MB ECC SO-DIMM for 3000S series RAID controllers		$165
AMM264KIT	64MB ECC SO-DIMM for 3000S series RAID controllers		$279

ARCO COMPUTER PRODUCTS, INC.

- Hardware RAID 1 (mirroring) works with most operating systems.
- Jumperless design, 100% data redundancy, 4 drive support
- Works off of existing IDE controller

ISA (ARDUPLIDISK) $189   PCI (ARDUPLIPCI) $195

Tekram

We are really impressed with these controllers. High quality at a very hot price. check them out!

DC315U	32 Bit PCI SCSI controller - no bios	$23
DC395U	32 Bit PCI Ultra SCSI controller	$75
DC390F	32 Bit PCI Ultra Wide SCSI controller	$72
DC390U2	32 Bit PCI Ultra-2 SCSI controller	$117
DC390U2W	32 Bit PCI Ultra-2 SCSI Dual Channel controller	$143
DC390U3W	1 Ultra 160 Channel & 1 Ultra Wide channel kit	$199

PROMISE TECHNOLOGY, INC.

ULTRA66	PCI, Supports Ultra-66 IDE drives	$29
ULTRA100	PCI, Supports Ultra ATA-100 drives	$45
FASTTRAK66	PCI, Supports Ultra ATA-66 IDE drives	$85
FASTTRAK100	PCI, SUPPORTS ULTRA ATA-100 RAID 0+1	$115

We're not just drives anymore. You've asked us for more, and we're giving it to you. If you need other computer equipment and supplies, call us. The same high quality commitment you have received from us for over a decade is now bigger and better than ever before - and GROWING!

WE KNOW RAID

Dirt Cheap Drives can custom configure a RAID tower to meet your needs. Here are a few popular components. We stock many other RAID components. Check us out on the web or give us a call.

IDE RAID CASE

Incredible quality. Extremely well built. Just add up to 6 IDE drives of any capacity, and an Ultra Wide SCSI controller to your computer and you are ready for high performance, fault tolerant RAID. Features hot swap drive shuttles, 4 cooling fans, and redundant hot swap power supplies. Run as RAID 0 or 5. Supports all major operating systems. **CALL FOR THE DEAL!**

Tower Model	(IDERAIDCASE)	$1999
Rack Mount Model	(IDERAIDRACK)	$1999

RAID SUITABLE ENCLOSURES

These hard drive enclosures are perfect for RAID or multiple drive applications. They feature hot swapable drive shuttles, and large cooling fans. These cases use a special backplane technology that allows you to use Wide SCSI, Ultra Wide SCSI, or Ultra-2 LVD hard drives without the normal cable length problems. Add drives and a DPT or Adaptec RAID controller for your complete high end RAID solution.

Also available in 80-pin models
2- $609
4- $769

2 Drive Desktop Model (FHCASEUSW) $589

4 Drive Desktop Model (DUALCASEUSW) $729

7 Drive Desktop Model		PLASTIC	BLACK
(QUADCASEUSW)	U,UW, W	$1399	$1419
(QUADCASEU7)	SCA	$1499	$1519

8 Drive Desktop Model			
(QUADCASE8U2)	U,UW, W	$1499	$1519
(QUADCASEU2)	SCA	$1599	$1619

7 Drive Desktop Model		PLASTIC	BLACK
(RACKCASEUSW)	U,UW, W	$1429	$1449
(RACKCASEU7)	SCA	$1529	$1549

8 Drive Desktop Model			
(RACKCASE8U2)	U,UW, W	$1529	$1549
(RACKCASEU2)	SCA	$1629	$1649

IDE RAID 1

IDE RAID has never been this easy. Simply install the bay mount RAID controller unit in a 3.5" drive bay, connect two same size IDE hard drives and boot-up. The unit does the rest for you. Totally transparent and requires no special command. Provides RAID 1 mirroring and features an audible alarm to alert you of drive failure. This is a great product.

	(ARDUPRAID)	$199
Same unit in 5.25" bay ready mount	(ARDUP5.25)	$209

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Axis Storpoint CD/DVD E100

THE ONLY SYSTEM THAT SUPPORTS MACINTOSH!

E100 features the fastest way to share CDs or DVDs across a network. Works with most operating systems, including Netware, Windows 95, 98, NT, Macintosh, Unix or Os2. Hard Disk caching provides blistering fast access to stacks of CDs or DVDs. (AXISCD/DVD) $765

Shock Mount Bracket

- Mounts in 5 1/4" HH bay
- Provides shock protection via rubber isolators for 3 1/22" drives. (SBRACKET) $33

Hot swappable drive setup for SCA drives

- Quality metal construction & front cooling fan!
- Mount three 1" high SCA drives in a single 5 1/4" full height drive bay. (SCA3DR-LVD) $229 or $309 for ext.

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Bundle prices good only if drive is sold at advertised price. Some exceptions may apply to low price guarantee. Prices & specifications subject to change without notice. Shipping charges are nonrefundable. Returns are subject to a restocking fee. No refunds on software or special orders (items not listed in ad). All products covered by manufacturer's warranty only. We reserve the right to refuse any sale. Personal checks held for clearance. All trademarks are registered trademarks of their respective companies. For complete terms and policies, see our website's checkout stand. Entire contents ©2000 Dirt Cheap Drives.

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SDRAM 66MHz

32MB	4X64	$39
64MB	8X64	$72
128MB	16X64	$145

PC100 SDRAM 100MHz

64MB	8X64-100	$72
128MB	16X64-100	$135
256MB	32X64-100	$299

PC100 ECC SDRAM 100MHz

64MB	8X72-100 ECC	$80
128MB	16X72-100 ECC	$159
256MB	32X72-100 ECC	$330

CALL FOR RAMBUS MEMORY

PC100 CAS 2 SDRAM 100MHz

64MB	8X64-100 CAS 2	$89
128MB	16X64-100 CAS 2	$149

PC100 CAS 2 ECC SDRAM 100MHz

64MB	8X72-100 CAS 2	$89
128MB	16X72-100 CAS 2	$185

PC133 SDRAM 133MHz

64MB	8X64-133	$79
128MB	16X64-133	$159
256MB	32X64-133	$325

CORSAIR MEMORY

64MB	PC100	$99
64MB	PC133	$99
128MB	PC100	$189
128MB	PC100 CAS2	$189
128MB	PC133	$189
256MB	PC133	$399

SIMMS 72-PIN & 30-PIN

NON-PARITY 72 PIN-60

4MB	1X32	$12
8MB	2X32	$17
16MB	4X32	$45
32MB	8X32	$95

EDO 72 PIN-60

4MB	1X32 EDO	$12
8MB	2X32 EDO	$20
16MB	4X32 EDO	$45
32MB	8X32 EDO	$95

TRUE PARITY 72 PIN-60

8MB	2X36-60	$25
16MB	4X36-60	$55
32MB	8X36-60	$99

30-PIN MEMORY

4MB	LOGIC PARITY	$13
4MB	TRUE PARITY	$18

PROCESSORS

B =	133MHz 512K Cache
E =	100MHz 256K Cache Coppermine
EB =	133MHz 256K Cache Coppermine

Intel Pentium III Slot 1

Intel PIII-500	$128
Intel PIII-533EB	$131
Intel PIII-550	$147
Intel PIII-600E	$174
Intel PIII-600B	$174
Intel PIII-600EB	$174
Intel PIII-650E	$174
Intel PIII-667EB	$177
Intel PIII-700E	$205
Intel PIII-733EB	$225
Intel PIII-750E	$244
Intel PIII-800E	$289

Intel Pentium III Socket 370 Flip Chip

Intel PIII-550E	$155
Intel PIII-600E	$185
Intel PIII-600EB	$185
Intel PIII-650E	$175
Intel PIII-667EB	$186
Intel PIII-700E	$195
Intel PIII-733EB	$208
Intel PIII-750E	$238

Intel Celeron Socket 370 Processors

Intel Celeron 466A PPGA	$89
Intel Celeron 500A PPGA	$99
Intel Celeron 533A PPGA	$105

Intel Celeron Socket 370/FCPGA

Intel Celeron 533 FCPGA	$99
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760i, 760ic	$32	$64			N/A

COMPAQ	8MB	16MB	32MB	64MB	BATTERY
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IBM	8MB	16MB	32MB	64MB	BATTERY
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NEC	8MB	16MB	32MB	64MB	BATTERY
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PC-87/88/8900 Series		$91			$132
PC-9040/70 Series	$32	$64			N/A
PC-9000 Series		$83	$154		$145

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- 3 x DIMM, 2 x SIMM up to 768MB, ATA/66
- BAT Form Factor ca. 244 x 219mm

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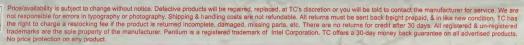- 56K Modem; Windows 98SE

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9.2GB 10000RPM	ST39204LW/LC	$258
18.4GB 10000RPM	ST318404LC/LW	$395
18.4GB 10000RPM	ST318404FC/FCV	$395
36.7GB 10000RPM	ST336704LW/LC/FC	$639
36.7GB 10000RPM	ST336704LWV/LCV/FCV	$799

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18.0GB 10000RPM	WDE18310-40	$246
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	Part Number	Chip Set	L2 Cache (KB)	Maximum Memory (MB)	168-pin DIMM Sockets	72-pin SIMM Sockets	Flash BIOS	Integrated Audio	Integrated Controller	PCI Slots	ISA Slots	AGP Slot	Format	Manufacturer's Warranty	Motherboard Only	w/AMD-K6-2/500	w/AMD-K6-2/550	w/Intel Pentium® MMX™ 233MHz
bX EP-MVP3C2	MB5406	VIA Apollo MVP3	512	384	3		Award		UltraDMA/66	4	2	1	Baby AT	2 Yrs.	$85	$144	$170	$145
bX EP-MVP3G5	MB5405	VIA Apollo MVP3	2048	384	3		Award		UltraDMA/66	5	2	1	ATX	2 Yrs.	$110	$169	$195	$170
VA-503+	MB5211	VIA Apollo MVP3	1024	512	2	4	Award			3	3	1	Baby AT	1 Yr.	$76	$135	$161	$136
e VA7-AV	MB5300	VIA Apollo MVP4	768	3		Award	AC-97	UltraDMA/66	5	2		ATX	3 Yrs.	$93	$152	$178	$153
ttle HOT-591P	MB5611	VIA Apollo MVP3	512	256	2	2	Award			3	3	1	Baby AT	1 Yr.	$80	$139	$165	$140
n S1590S Trinity 100AT	MB5006	VIA Apollo MVP3	1024	384	3	2	Award			4	4	1	Mini AT	3 Yrs.	$99	$158	$184	$159

Slot A

	Part Number	Chip Set	Maximum Memory (MB)	168-pin DIMM Sockets	Flash BIOS	Bus Frequency	Integrated Controller	PCI Slots	ISA Slots	AGP Slot	Format	Manufacturer's Warranty	Motherboard Only	w/AMD Athlon™ 750MHz	w/AMD Athlon 800MHz	w/AMD Athlon 850MHz	w/AMD Athlon 900MHz	w/AMD Athlon 950MHz	w/AMD Athlon 1000MHz	w/AMD Athlon 1100MHz
														$195	$220	$285	$325	$425	$570	$780
T KA7-100	MB7502	VIA Apollo KX133	2048	4	Award	200/133	UltraDMA/100	6	1	1	ATX	1 Yr.	$189	$384	$409	$474	$514	$614	$759	$969
us K7V	MB7703	VIA Apollo KX133	1536	3	Award	200/133	UltraDMA/66	5		1	ATX	1 Yr.	$176	$371	$396	$461	$501	$601	$746	$956
bX EP-7KXA	MB7850	VIA Apollo KX133	768	3	Award	200/133	UltraDMA/66	5	1	1	ATX	2 Yrs.	$120	$315	$340	$405	$445	$545	$690	$900
SD11	MB7401	AMD-751 / VIA 686A	768	3	Award	100	UltraDMA/66	5	1	1	ATX	1 Yr.	$112	$307	$332	$397	$437	$537	$682	$892
ttle AI61	MB7901	AMD-750	768	3	Award	100	UltraDMA/66	5		1	MicroATX	1 Yr.	$105	$300	$325	$390	$430	$530	$675	$885
n S2380 Trinity K7	MB7000	VIA Apollo KX133	768	3	Award	200/133	UltraDMA/66	6	1	1	ATX	3 Yrs.	$132	$327	$352	$417	$457	$557	$702	$912

Socket A

	Part Number	Chip Set	Maximum Memory (MB)	168-pin DIMM Sockets	Flash BIOS	Bus Frequency	Integrated Controller	PCI Slots	ISA Slots	AGP Slot	Format	Manufacturer's Warranty	Motherboard Only	w/AMD Duron™ 600MHz	w/AMD Duron 650MHz	w/AMD Duron 700MHz	w/AMD Duron 750MHz	w/AMD Athlon™ 750MHz with Enhanced Cache	w/AMD Athlon 800MHz with Enhanced Cache	w/AMD Athlon 850MHz with Enhanced Cache	w/AMD Athlon 900MHz with Enhanced Cache	w/AMD Athlon 950MHz with Enhanced Cache	w/AMD Athlon 1000MHz with Enhanced Cache	w/AMD Athlon 1100MHz with Enhanced Cache
T KTV	MB7503	VIA Apollo KT133	1536	3	Award	200/133	UltraDMA/66	6	1	1	ATX	1 Yr.	$169	$252	$269	$299	$344	$364	$389	$454	$494	$594	$739	$949
T KTV-RAID	MB7504	VIA Apollo KT133	1536	3	Award	200/133	DMA/100 RAID	6	1	1	ATX	1 Yr.	$199	$282	$299	$329	$374	$394	$419	$484	$524	$624	$769	$979
US A7V	MB7704	VIA Apollo KT133	1536	3	Award	200/133	UltraDMA/100	5		1	ATX	1 Yr.	$173	$256	$273	$303	$348	$368	$393	$458	$498	$598	$743	$953
bX EP-8KTA	MB7851	VIA Apollo KT133	768	3	Award	200/133	UltraDMA/66	6	1	1	ATX	2 Yr.	$157	$240	$257	$287	$332	$352	$377	$442	$482	$582	$727	$937
AZ11	MB7402	VIA Apollo KT133	1536	3	Award	200/133	UltraDMA/66	5		1	ATX	1 Yr.	$144	$227	$244	$274	$319	$339	$364	$429	$469	$569	$714	$924
crostar K7T Pro	MB7203	VIA Apollo KT133	1536	3	Award	200/133	UltraDMA/66	5		1	ATX	1 Yr.	$159	$242	$259	$289	$334	$354	$379	$444	$484	$584	$729	$939

Slot 1

	Part Number	Chip Set	Maximum Memory (MB)	168-pin DIMM Sockets	168-pin RIMM Sockets	Flash BIOS	Integrated Audio	Integrated Controller	PCI Slots	ISA Slots	AGP Slot	Format	Manufacturer's Warranty	Motherboard Only	w/Intel® Pentium III® 600/8 512K 100/133MHz FSB	w/Intel Pentium III 700 256K OD 100MHz FSB	w/Intel Pentium III 733 256K OD 133MHz FSB	w/Intel Pentium III 750 256K OD 100MHz FSB	w/Intel Pentium III 800/EB 256K OD 100/133MHz FSB	w/Intel Pentium III 850 256K OD 100MHz FSB	w/Intel Pentium III 933 256K OD 133MHz FSB	w/Intel Pentium III 1000 256K OD 133MHz FSB	w/Dual Intel Pentium III 600 512K OD 100MHz FSB	w/Dual Intel Pentium III 850 256K OD 100MHz FSB
T BE6-II	MB6508	Intel 440BX	768	3		Award		UltraDMA/66	5	1	1	ATX	1 Yr.	$141	$341	$376	N/A	$431	$446	N/A	N/A	N/A	N/A
T BX133-RAID	MB6513	Intel 440BX	768	3		Award		DMA/100 RAID	5	1	1	ATX	1 Yr.	$199	$399	$434	N/A	$489	$504	N/A	N/A	N/A	N/A
T VT6X4	MB6510	VIA Apollo Pro 133A	768	3		Award	AC-97	UltraDMA/66	5	2	1	ATX	1 Yr.	$105	$305	$340	$340	$395	$410	$525	$715	$925	N/A
US P2B-DS (Dual)	MB6707	Intel 440BX	1024	4		Award			4	2	1	ATX	1 Yr.	$512	$712	$747	N/A	$802	$817	N/A	N/A	$912	$1352
US P3B-F	MB6720	Intel 440BX	1024	4		Award			6	1	1	ATX	1 Yr.	$141	$341	$376	N/A	$431	$446	N/A	N/A	N/A	N/A
US P3V4X	MB6723	VIA Apollo Pro 133A	1024	4		Award		UltraDMA/66	6	1	1	ATX	1 Yr.	$130	$330	$365	$365	$420	$435	$550	$740	$950	N/A
bX EP-6VBA2	MB6855	VIA Apollo Pro 133A	768	3		Award	AC-97	UltraDMA/66	4	2	1	ATX	2 Yrs.	$105	$305	$340	$340	$395	$410	$525	$715	$925	N/A
l L440GX+ (Dual)	MB6917	Intel 440GX	2048	4		Intel/Phoenix		Adaptec 2-Ch U2W	6	1		ATX	3 Yrs.	$561	$761	$796	N/A	$851	$866	N/A	N/A	$961	$1401
el SE440BX-2 "Seattle"	MB6921	Intel 440BX	768	3		Intel/Phoenix			4	2	1	ATX	3 Yrs.	$120	$320	$355	N/A	$410	$425	N/A	N/A	N/A	N/A
ttle AV64	MB6309	VIA Apollo Pro 133A	768	3		Award		UltraDMA/66	5	2	1	ATX	1 Yr.	$96	$296	$331	$331	$386	$401	$516	$706	$916	N/A
erMicro P6DGU (Dual)	MB6122	Intel 440GX	2048	4		AMI		Adaptec U2W	5	2	1	ATX	1 Yr.	$485	$685	$720	N/A	$775	$790	N/A	N/A	$885	$1325
erMicro P6SBA	MB6120	Intel 440BX	768	3		AMI			4	3	1	ATX	1 Yr.	$103	$303	$338	N/A	$393	$408	N/A	N/A	N/A	N/A
erMicro P6SBU	MB6128	Intel 440BX	1024	4		AMI		Adaptec U2W	4	3	1	ATX	1 Yr.	$343	$543	$578	N/A	$633	$648	N/A	N/A	N/A	N/A
n S1834 Tiger 133 (Dual)	MB6020	VIA Apollo Pro 133A	2048	4		Award		UltraDMA/66	6	1	1	ATX	3 Yrs.	$162	$362	$397	$397	$452	$467	$582	$772	$982	$562	$1002

Socket 370

	Part Number	Chip Set	Maximum Memory (MB)	168-pin DIMM Sockets	Flash BIOS	Integrated Audio	Integrated Video	PCI Slots	ISA Slots	AGP Slot	AMR or CNR Slot	Format	Manufacturer's Warranty	Motherboard Only	w/Intel® Celeron™ processor 566 MHz 128K OD 66MHz FSB	w/Intel Celeron 633 128K OD 66MHz FSB	w/Intel Celeron 667 128K OD 66MHz FSB	w/Intel Celeron 700 128K OD 66MHz FSB	w/Intel Celeron 733 128K OD 66MHz FSB	w/Intel Pentium III 733 256K OD 133MHz FSB	w/Intel Pentium III 800/EB 256K OD 100/133MHz FSB	w/Intel Pentium III 850 256K OD 100MHz FSB	w/Intel Pentium III 866 256K OD 133MHz FSB	w/Intel Pentium III 933 256K OD 133MHz FSB	w/Intel Pentium III 1000 256K OD 133MHz FSB
T SE6	MB6512	Intel 815E	768	3	Award	Intel 815E	Intel 815E	6		1	1	ATX	1 Yr.	$172	$259	$287	$310	$341	$379	$407	$477	$592	$607	$782	$992
T VH6	MB6511	VIA Apollo Pro 133A	768	3	Award	AC-97		5	1	1	1	ATX	1 Yr.	$113	$200	$228	$251	$282	$320	$348	$418	$533	$548	$723	$933
US CUBX	MB6726	Intel 440BX	1024	4	Award	AC-97		6	1	1		ATX	1 Yr.	$149	$236	$264	$287	$318	$356	N/A	$454	$569	N/A	N/A	N/A
US CUSL2	MB6727	Intel 815E	768	3	Award	Intel 815E	Intel 815E	6	1	1	1	ATX	1 Yr.	$179	$266	$294	$317	$348	$386	$414	$484	$599	$614	$789	$999
US CUV4X	MB6725	VIA Apollo Pro 133A	1536	3	Award	AC-97		5	1	1	1	ATX	1 Yr.	$130	$217	$245	$268	$299	$337	$365	$435	$550	$565	$740	$950
bX EP-3VCA	MB6854	VIA Apollo Pro 133A	768	3	Award	AC-97		4	1	1	1	ATX	2 Yrs.	$105	$192	$220	$243	$274	$312	$340	$410	$525	$540	$715	$925
FA11	MB6412	VIA Apollo Pro 133A	1024	4	Award			5	2	1		ATX	1 Yr.	$105	$192	$220	$243	$274	$312	$340	$410	$525	$540	$715	$925
el D815EEA "Easton"	MB6922	Intel 815E	512	3	Award	Intel 815E	Intel 815E		1		1	ATX	3 Yrs.	$175	$262	$290	$313	$344	$382	$410	$480	$595	$610	$785	$995
ttle AV14	MB6311	VIA Apollo Pro 133A	768	3	Award			5	2	1		ATX	1 Yr.	$96	$183	$211	$234	$265	$303	$331	$401	$516	$531	$706	$916
ttle ME64	MB6310	Intel 810E	512	2	Award	Intel 810E	Intel 810E	3			1	Micro ATX	1 Yr.	$114	$201	$229	$252	$283	$321	$349	$419	$534	$549	$724	$934
erMicro 370SEA	MB6140	Intel 810E	512	2	AMI	Intel 810E	Intel 810E	6	1			ATX	1 Yr.	$142	$229	$257	$280	$311	$349	$377	$447	$562	$577	$752	$962
erMicro 370DLE (Dual)	MB6154	ServerWorks LE	2048	2	AMI			6	1			ATX	1 Yr.	$342	$429	$457	$480	$511	$549	$577	$647	$762	$777	$952	$1162
erMicro 370DL3 (Dual)	MB6155	ServerWorks LE	2048	2	AMI			6	1			ATX	1 Yr.	$545	$632	$660	$683	$714	$752	$780	$850	$965	$980	$1155	$1365
n S1854 Trinity 400	MB6018	VIA Apollo Pro 133A	768	3	Award			6	1	1		ATX	3 Yrs.	$109	$196	$224	$247	$278	$316	$344	$414	$529	$544	$719	$929

Slot 2

	Part Number	Chip Set	Maximum Memory (MB)	168-pin DIMM Sockets	Flash BIOS	Integrated Audio	Integrated Video	Integrated Controller	Integrated Networking	PCI Slots	ISA Slots	AGP Slot	Format	Manufacturer's Warranty	Motherboard Only	w/Intel® Pentium III® Xeon™ 550MHz 512K 100MHz FSB	w/Intel Xeon 550MHz 512K 100MHz FSB	w/Intel Xeon 550MHz 1M 100MHz FSB	w/Dual Intel Xeon 550MHz 512K 100MHz FSB	w/Dual Intel Xeon 550MHz 1M 100MHz FSB	w/Intel Xeon 700MHz 1M 100MHz FSB	w/Intel Xeon 700MHz 2M 100MHz FSB	w/Dual Intel Xeon 700MHz 1M 100MHz FSB	w/Quad Intel Xeon 700MHz 1M 100MHz FSB
erMicro S2DL3	MB6156	ServerWorks LE	4096	4	AMI			Adaptec Ultra160	Intel 82552	6	1		ATX	1 Yr.	$676	$1776	$3006	$5016	$2876	N/A	$2076	$3026	$3476	N/A
erMicro S2QR6	MB6190	ServerWorks HE	16384	16	AMI			Adaptec 2-Ch Ultra160	Intel 82559	8			SWTX	1 Yr.	$2732	$3832	$5062	$7072	$4932	$7132	$4132	$5082	$5532	$8332

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- 256MB Kingmax TinyBGA PC133 SDRAM Memory (768KB Max)
- ASUS AGP-V7700 GeForce2 GTS Pure 4X AGP w/ 32MB DDR SGRAM
- IBM Deskstar 45GXP 45GB 8.5ms 7200rpm Ultra ATA/100 Hard Drive with 2048KB Buffer
- ViewSonic PF790 PerfectFlat (Trinitron) 19" (18") .25 Aperture Grille Pitch 1600@77Hz Monitor
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- Teac 3½" 1.44MB Floppy Disk Drive
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- Logitech Internet Keyboard
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- ATi RAGE FURY PRO VIVO AGP4X 32MB SDRAM w/Video-In and Video-Out
- Western Digital WD307AA 30.7GB 5400rpm 9.5ms UltraATA/66 Hard Drive with 2048KB Buffer
- Tatung C7BZR-25 17" (15.9") .25mm 1600@77Hz Monitor
- Shuttle SDVD-101 10X DVD-ROM / 40X CD-ROM Drive
- Creative Sound Blaster Live! PCI Sound Card
- Midiland MLi-480 3-Piece Speaker System with 2x6W Satellites and 1x18W Wooden Subwoofer
- Teac 3½" 1.44MB Floppy Disk Drive
- SmartLink 56K V.90 PCI Voice Faxmodem
- Super Mini Tower 250W ATX: 7 Drive Bays 2 External 3.5" (1 Used) / 2 Internal 3.5" (1 Used) 3 External 5.25" (1 Used)
- Logitech First Mouse +w/scroll wheel
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- Quantum Atlas V QM336700XC-LW 36.7GB 7200rpm 6.3ms Ultra160 SCSI Hard Drive with 2048KB Buffer
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- Pine PT5968-28 AGP2X Graphic Accelerator with SiS 6326 and 8MB SDRAM
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- 3Com Fast EtherLink XL TX 10/100 PCI Adapter
- Teac 3½" 1.44MB Floppy Disk Drive
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- 300W ATX v2.01 UL Power Supply
- Acer 104-key Keyboard, Logitech Wheel Mouse
- MS Windows 2000 Server w/5 Client Access Licenses
- 7 Expansion Slots: 4 PCI Slots (2 Used) / 3 ISA Slots (0 Used) / 1 AGP (0 Used) Slot

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- Dual Processor Capable
- 2048 / 1024KB ECC Integrated L2 cache
- 512MB Corsair CAS Latency 2 SDRAM PC100 Memory (4096MB Max)
- Seagate Cheetah 73 ST173404 73.4GB 5.6ms 10000pm Ultra160 SCSI LVD 4096KB Buffer
- Adaptec AIC-7892 Ultra160 SCSI LVD Controller
- 3Dlabs Oxygen GVX210 - AGP Graphic Accelerator with Dual 3Dlabs Glint R3 rasterizers and Gamma G2 geometry and 256-bit 64MB SGRAM frame buffer memory and ability to manipulate up to 256MB of textures in single scene
- ViewSonic P817 Xtreme Monitor™ 21" (20") .26mm 2048x1536@85Hz Monitor with USB
- Toshiba XM-6702B 48X Max Variable CD-ROM
- Integrated Intel 10/100 Ethernet Adapter
- Server Tower 11 Drive Bays: 1 External 3.5" (1 Used) / 2 Internal 3.5" (1 Used) / 7 External 5.25" (1 Used) / 1 Internal 5.25" (0 Used)
- 300W ATX v2.01 UL Power Supply
- Acer Keyboard (mechanical keyswitch), Two USB Port MS IntelliMouse®
- MS Windows 2000 Professional
- 7 Expansion Slots: 2 64-bit PCI Slots / 4 32-bit PCI Slots / 1 AGP Pro (Used) Slot

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